



**METAL GURU**  
**HOW AEROSPACE**  
**DRIVES MAIDEN'S**  
**BRUCE DICKINSON**  
**WORKING WEEK**

**INDUSTRIAL PACT**  
Chinese delivery centre  
edges closer after Boeing  
finalises 300-unit deal  
for nation's carriers **7**

**FJORD FOCUSED**  
First Norwegian F-35A  
emerges as Oslo begins  
its transition to eventual  
52-strong fighter fleet **9**

# FLIGHT

## INTERNATIONAL

From  Flightglobal

29 SEPTEMBER-5 OCTOBER 2015

HELICOPTERS

## ROTARY RENEWAL

Why models like the next-gen H160  
are set to transform commercial sector

£3.50





# THINK MEDICAL ASSISTANCE

Our helicopters are a flying life support system for paramedics and rescue services. Always on call to reach casualties of accidents and disasters or evacuate critical care patients.  
**Prescribe an H145.**



Important to you. Essential to us.





### COVER IMAGE

The first prototype of Airbus Helicopters' H160 is pictured during a test flight. Our commercial rotorcraft special looks at the sector's prospects **P23**



### BEHIND THE HEADLINES

Our rotorcraft special saw **Dominic Perry** (pictured) visit **Marengo Swisshelicopter** and try on its **SKYe SH09** for size (**P30**). And in **Fort Worth, Texas**, **James Drew** attended the roll-out event for the **Royal Norwegian Air Force's** first **F-35 Lightning II** (**P9**)



### NEXT WEEK UAV TRAINING

We visit the **US Air Force's** Holloman AFB in New Mexico to witness how its crews are trained to operate the **Reaper**

## NEWS

### THIS WEEK

- 6** SKYe no limit for bullish Marengo
- 7** Boeing erects 'Pillars for Partnership'. New Hawk is flown for Saudi Arabia. Airbus looks to put A320 costs under the SCOPE+
- 8** Robots take over 777 work. Relentless test progress for Bell 525. Flightglobal's Fleets Analyzer makes debut
- 9** Norway marks new era with first F-35

### AIR TRANSPORT

- 10** Saudi An-132 on track as Antonov abandons Russia. China outlines its African ambitions. Airbus project looks to pump up fuel usage
- 11** Unsafe load led to Bagram 747 loss. SHARP cuts down A320neo runway requirements
- 12** DT and Inmarsat connect for wi-fi deal. Macon is the winner as Triumph loses 747 work
- 13** PacAvi's freight expectations for A320

### DEFENCE

- 14** Brimstone target for UK Apaches. Raytheon's Sentinel is eyed by overseas buyers. Thai air force purchases four T-50s
- 15** Conventional shift for B-52. Bell rolls out new price promise for V-280 tiltrotor. Russia, Israel open airspace communications
- 17** Rapid reaction to Raptor strategy. Hermes pairing proposed for adaptation in Poland

### BUSINESS AVIATION

- 18** Diamond nears first delivery of DA62 piston-twins to unnamed operators. Al Jaber announces move into MRO. A step up in stair style, says Sierra
- 19** LHT points to split-tip first. Etihad bolsters suite of services with charter offer

### NEWS FOCUS

- 20** Airbus influence helps to shape supersonic AS2



Brimstone trains sights on Apache derivative deal **P14**

## COVER STORY

- 23 Recovery mode** The civil helicopter industry is preparing for its annual European gathering at the Helitech show in London against a backdrop of falling sales and a troubled offshore oil and gas market. Nonetheless, optimism still persists, with a number of new programmes under way

## FEATURES

- 24 ROTORCRAFT Lifting the standard** Helicopter manufacturers are delivering new rotorcraft to the market despite downturn
- 30 Swiss precision** Marengo Swisshelicopter is bringing a fresh approach to the industry as its SKYe SH09 takes to the air
- 32 London calling** After more than two decades with one aircraft, London's Air Ambulance charity is poised to acquire a second helicopter
- 34 Safety First** Almost a decade on from the launch of the International Helicopter Safety Team, accident numbers are beginning to decrease

## REGULARS

- 5 Comment**
- 37 Straight & Level**
- 40 Classified**
- 43 Jobs**
- 47 Working Week**



Getting airborne with London's Air Ambulance **P32**. Saudi An-132 on track as Antonov abandons Russia **P10**



Download the Military Simulator Census online now.  
[www.flightglobal.com/milisim](http://www.flightglobal.com/milisim)



CAE offers training centres, training services, and simulation products for trainer and fighter aircraft.



## IMAGE OF THE WEEK

Scandinavian Airlines has received its first of four higher-weight, longer-range Airbus A330-300s, with the maximum 242t model using Rolls-Royce Trent 700 engines. Flightglobal's Fleets Analyzer database records Delta Air Lines, Hainan Airlines and SriLankan Airlines as earlier recipients

View more great aviation shots online and in our weekly tablet edition:



[flightglobal.com/](http://flightglobal.com/)  
[flight-international](http://flight-international)



Airbus

## THE WEEK IN NUMBERS

**5.1%**

Shell Aviation

Shell Aviation is pleased with half-year sales growth of its AeroShell piston engine oil – the world's "best-selling" type

**\$73m**

Accenture Federal Services

The US Air Force has awarded Accenture a 30-month deal to build it "a 21st century financial management system"

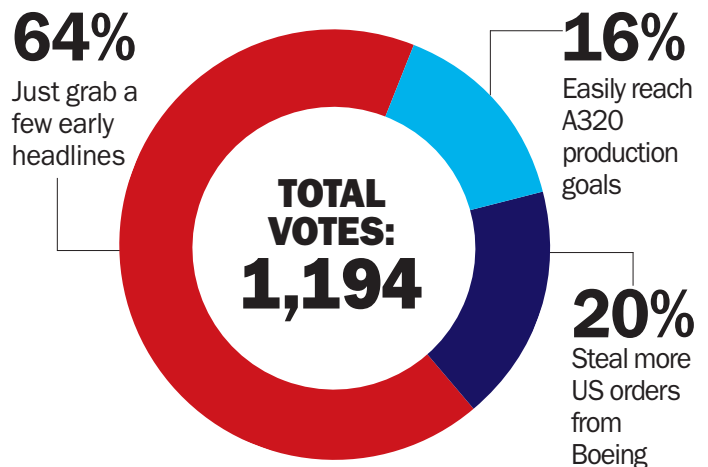
**100m**

Flightglobal dashboard

Total number of passengers Dubai International airport expects to cope with by 2020. It had been expecting 90m

## QUESTION OF THE WEEK

Last week, we asked: **With its Mobile final assembly line, Airbus can:** You said:



This week, we ask: **As Norway's first JSF emerges, the nation is:**

- ☐ Right to keep faith with F-35
- ☐ Buying the wrong aircraft
- ☐ Outnumbered by Russia either way

Vote at [flightglobal.com](http://flightglobal.com)



dashboard

Flightglobal's premium news and data service delivers breaking air transport stories with profiles, schedules, and fleet, financial and traffic information [flightglobal.com/dashboard](http://flightglobal.com/dashboard)



Flightglobal  
AVIATION CONNECTED

IN ASSOCIATION WITH

**Honeywell**

Keep track of the latest developments in  
in-flight connectivity

[www.flightglobal.com/connectivity](http://www.flightglobal.com/connectivity)



# From little acorns?

Boeing's commitment to build deeper ties with Chinese industry and to create an in-country 737 completions centre do not signal a strategic shift, but with time, links may deepen

A state-owned Chinese company has committed to buy up to 300 Boeing aircraft to distribute among airlines and leasing companies.

Boeing has agreed to use Chinese manufacturer AVIC more in its commercial aircraft supply chain, and with Comac to jointly set up an in-country narrowbody completions and delivery centre.

Sometimes a single announcement can signal a grand strategic move, binding two countries in partnership beyond a simple commercial transaction.

For Boeing, there was a moment in the 777 programme in the early 1990s when the role of Japanese industry and airlines rose above buying and selling. Its airlines now enjoy premier status as Boeing customers. And only Spirit AeroSystems is more firmly embedded in the top tier of Boeing's supply chain than the three Japanese "heavies" – Mitsubishi, Kawasaki and Fuji.

## Boeing's 20-year forecast sees Chinese customers receiving 4,630 single-aisles, to 2034

How do the recent agreements with China compare? So far, it is not even close.

Creation of the completion and delivery centre in China is not, in itself, a strategic shift. On the face of it, it seems impressive. Never before has Boeing performed these tasks outside the USA. However, the Comac deal falls short of Airbus's A320 final assembly line in Tianjin. Rather, it seems more like a practical solution to a looming capacity problem in Renton, Washington, the site that currently assembles 42 737s per month. With production rates rising to 52 each month by 2018, it makes sense for Boeing to look for alternate venues



Built in Seattle, completed in China

for furnishing and painting already assembled aircraft.

China is the obvious location to place such work. Boeing's latest market forecast assumes Chinese customers will take delivery of 4,630 new single-aisle aircraft over the next 20 years – a staggering average rate of 19 single-aisle deliveries each month – up to 2034.

Even if Boeing must split the single-aisle market with four competitors – Airbus and the three new entrants – the numbers easily justify a permanent delivery centre, if not more. Potentially more significant is the commitment to share more sub-assembly work with AVIC. Japan's industry became involved in Boeing in much the same way, beginning with the 767 programme in the late-1970s. It will be revealing to monitor the work packages assigned to AVIC as the deal is finalised.

Boeing's industrial presence in China is certain to continue growing. One day, perhaps, there could be a Chinese-assembled "7C7", but these latest agreements fall far short of such a move. ■

See This Week P7

## One to watch

Just 35 miles – and several mountains – separate the small Swiss towns of Pfäffikon and Stans.

The latter, of course, is home to Switzerland's aerospace champion Pilatus. It is rightly famous for producing aircraft that, while having competitors, are sufficiently differentiated to have carved their own niche.

And as anyone who has encountered its chairman Oscar Schwenk will attest, Pilatus has a different way of doing things.

Despite Switzerland being famed for its innate conservatism, that rebellious attitude seems to have taken root in Pfäffikon too.

Here, located in a former cider factory, Marengo Swisshelicopter is hoping its entry into the market for

light single-engined rotorcraft will take on the sector's established players.

The SKYe SH09 will not revolutionise the segment, but it features a clutch of innovations that make it stand out from its competitors. Small volumes, high precision – like watch-making, as the company likes to say.

Marengo has not had everything its own way. An optimistic development timeline has inevitably slipped. Nonetheless, the relatively rapid transition from drawing board to flying prototype has been impressive.

Provided that momentum can be sustained and, crucially, programme funding maintained, the market will have a new challenger on its hands. ■

See Feature P30



Keep up to speed with more of aerospace's top stories on our premium industry news site: [flightglobal.com/dashboard](http://flightglobal.com/dashboard)



# BRIEFING

## QATAR MISHAP FOLLOWED SHORT TAKE-OFF RUN

**INCIDENT** Investigations into a Qatar Airways Boeing 777-300ER's collision with approach lighting during departure to Doha from Miami on 15 September will examine whether its intersection take-off played a part. Aircraft A7-BAC started its take-off roll from runway 9's T1 intersection, which reduced the available length to 2,800m (9,190ft). The US Federal Aviation Administration says the aircraft continued to its destination without further incident, but subsequent inspection revealed "substantial" damage to its fuselage underside.

## INDIA READY TO SIGN HELICOPTER DEALS

**ORDERS** India will, in the coming weeks, sign a roughly \$2.2 billion contract for 22 Boeing AH-64E Apache attack helicopters and 15 CH-47F Chinook transports, after its Cabinet Committee on Security approved the purchases. New Delhi's original request for proposal contained options for an additional 11 Apaches and seven Chinooks for its air force. Deliveries are likely to start within 36 months.

## SUPERJET COULD FIND HOME IN GREENLAND

**FLEET** Proposed start-up carrier Greenland Express appears to be interested in resurrecting its operating plans with Sukhoi Superjet 100s. The would-be airline has suffered a number of setbacks to its plan to establish an operation in Greenland, including scrapping its intended 2015 flight programme. Now it suggests it will "receive two" Superjets in 2016 and the "rest" in 2017-2018.

## UNDISCLOSED AFRICAN CUSTOMER PICKS C-27J

**ACQUISITION** Alenia Aermacchi has bolstered its backlog for the C-27J medium transport, with a two-unit order from an undisclosed African nation. The deal brings its number of customers to three on the continent, with the air forces of Chad and Morocco having been supplied with two and four aircraft, respectively. The Rolls-Royce AE2100-engined aircraft will be delivered from 2017, and used for troop transport, homeland security and civil protection tasks.

## PERLAN 2 SOARS IN OREGON

**TESTING** A successful first flight of the Perlan 2 experimental glider has moved the Airbus Perlan Mission II a step closer to a goal of achieving sustained, piloted flight at 90,000ft. The 25.6m (84ft) wingspan aircraft was towed aloft on 23 September from the Redmond Municipal airport in Redmond, Oregon, before making a 20min descent from 5,000ft. The next test flights will begin in December in Minden, Nevada, at altitudes above 40,000ft.

## POLAND WELCOMES SU-22 UPDATES

**MODIFICATIONS** A first pair of modified Sukhoi Su-22M4s have been returned to use at Poland's Swidwin air base, after having new radios installed and cockpit instruments labelled with imperial units at the WZL-2 depot in Bydgoszcz. Ten more of the strike aircraft and six Su-22UM3K trainers will be updated – also getting a new grey camouflage scheme – with their use to continue for another decade.

## IMPROVED CAÏMAN FOR FRENCH NAVY

**DELIVERY** The French navy has received its 15th, of an eventual 27, NH Industries NH90 'Caïman' maritime helicopters. The rotorcraft is the service's first to arrive in a final radar configuration standard, which delivers enhanced detection performance in rough seas. Improvements have also been made to the Thales-produced Flash dipping sonar, for better submarine detection and classification.



Marenco Swisshelicopter

Maiden sortie of the initial prototype took place in October 2014

**ROTORCRAFT** DOMINIC PERRY PFÄFFIKON

# SKYe no limit for bullish Marenco

Swiss start-up contemplates next programme as it works to restart flight tests of developmental SH09 light single

**M**arenco Swisshelicopter is contemplating a twin-engined successor to its developmental SKYe SH09 light single, even as it works towards restarting flight tests of the new type.

An initial test campaign with a first flying prototype of the 2.6t SH09 lasted from October 2014 until the first half of 2015, with several hours of flight up to trans-lational speed.

Airborne evaluations were then paused, in order to concentrate resources on the development of a second example.

Production of components and major fuselage structures – for assembly at Marenco's Mollis facility – of the second flight-test article is under way, including a key modification to the bearing-free rotor head.

Martin Stucki, chief executive of the Pfäffikon-headquartered manufacturer, says even before Marenco flew the first iteration of the part, it knew it would require modification.

"What we wanted to achieve from the redesign was a stable design and reduced complexity of the component," he says.

The second prototype is due to fly "most probably" at the end of 2015 or at the beginning of 2016 and, subject to a successful vali-

dation, the change to the rotor head will then be installed on the earlier helicopter.

A third flying prototype, likely to roll-out in 2016, is designed to be close to the eventual production standard, says Stucki, although the exact timing will depend on how many certification points can be addressed with the earlier examples.

Certification and service entry are likely in late 2016 if everything "goes extremely well", or 2017, he says, with either to be a slippage from an initial 2015 target.

Further out, Stucki says the next logical step would be a twin-engined model.

"What we can visibly develop is a twin, and if we go for that, it would be a high-performance twin." The airframe already has sufficient space for an additional engine, he says, aided by the small footprint of the 1,020shp (760kW) Honeywell HTS900-2 that powers the SH09.

"We can easily go to a twin," says Stucki, "although another option for us would be a high-performance flying crane with an engine upgrade.

"But at the moment we are 100% focused on the development of the SH09." ■

**See Feature P30**





Norway marks new era with first F-35  
THIS WEEK P9

COLLABORATION STEPHEN TRIMBLE WASHINGTON DC

# Boeing erects 'Pillars for Partnership'

Chinese premier's visit to Everett brings announcement of 737 completions centre, AVIC supply deal, and biofuel project

**B**oeing will open its first foreign completion and delivery centre in China in collaboration with potential rival Comac, broaden industrial ties with supplier AVIC, and launch an initiative to develop biofuel from Chinese agricultural waste.

All three initiatives – billed grandiosely as “Pillars for Partnership” – were announced as part of Chinese president Xi Jinping's visit on 23 September to Boeing's widebody assembly complex in Everett, Washington.

The new facility in China will be operated jointly by Boeing and Comac, the manufacturer of the C919 narrowbody. Workers there will install interiors, paint liveries and deliver 737-family aircraft to Chinese customers.

The completion and delivery centre stops short of becoming a fourth final assembly site for the 737 in addition to three active lines in Renton, Washington.

But the commitment to open the facility at a location and time to be announced later should “enhance” Boeing's access to the fast-growing Chinese aviation market, company officials say.

## BARGAINING CHIPS

Boeing's two largest unions – the International Association of Machinists and Aerospace Workers and the Society of Professional Engineering Employees in Aerospace – immediately protested that Boeing was using union jobs as “bargaining chips” in sales discussions with customers.

But Boeing executives say the new Chinese facility will enable an increase in production rates for the 737, creating more demand for labour on the three final assembly lines in Renton. Boeing is already raising 737 monthly deliveries from 42 to 52 by 2018.

China has become Boeing's largest commercial customer,

taking delivery of 155 aircraft already this year. And the premier's visit was also used to announce a commitment from China Aviation Supplies Holding to purchase up to 300 aircraft, including 190 737s and 50 unspecified widebody aircraft for Chinese airlines. Another 60 737s will be purchased for leasing companies ICBC and CDB Leasing.

“The 737 will be a cornerstone of the Chinese fleet for years to come, and we look forward to delivering 737s to Chinese customers in China,” says Boeing Commercial Airplanes chief executive Ray Conner.

At the same time, Boeing also pledged to expand its industrial partnership with AVIC. Chinese suppliers already hold major positions in Boeing's supply chain, building horizontal stabilisers, vertical fins and wing panels for the 737, rudders for the 787 and control surfaces for the 747-8.



Jinping visited the airframer's widebody site on 23 September

A new framework agreement commits the partners to add major component assembly work for Boeing commercial aircraft by AVIC.

Finally, Boeing will also help China develop technologies and processes to convert waste, such as corn cobs and wheat stalks, into jet fuel under a memorandum of understanding signed with the National Development Reform Commission. ■



## DEBUT

# New Hawk is flown for Saudi Arabia

Saudi Arabia's first new-generation Hawk advanced jet trainer made its debut flight from BAE Systems' Warton assembly site in Lancashire, the UK, on 16 September. Performed by test pilot Andy Blyth, the sortie was “the first in a series of test flights”, according to the manufacturer.

Currently bearing the UK military registration ZB101, the aircraft is one of 22 Mk 165 examples ordered for the Royal Saudi Air Force in May 2012, along with 55 Pilatus PC-21 turboprop trainers – deliveries of which started in June 2014. BAE is expected to deliver its first new Hawks to the Middle East during 2016.

PROGRAMME STEPHEN TRIMBLE WASHINGTON DC

# Airbus looks to put A320 costs under the SCOPE+

**A**irbus confirms the company is in the middle of a campaign to slash costs on the A320 programme that one supplier likens to Boeing's “partnership for success” (PFS) effort.

Its single-aisle cost optimisation programme-plus (SCOPE+) initiative began 12-18 months ago with escalating production rates on the A320 family – creating opportunities to trade cost concessions from suppliers in return for access to larger volumes.

A year earlier, Boeing launched its own cost-reduction plan, putting non-co-operative suppliers on a “no-fly” list and negotiating concessions with the rest, with an overall saving target of 15%.

Airbus confirms the existence of SCOPE+ but declines to release

details or cost reduction goals. The plan does, however, differ from Boeing's PFS in being limited to one aircraft family, rather than all commercial programmes.

Sanjay Kapoor, senior vice-president and chief financial officer of Spirit AeroSystems, discussed his own company's association with the SCOPE+ programme during an investor presentation on 17 September.

“SCOPE+ is Airbus's initiative to find ways to reduce cost as they increase their rates,” Kapoor says.

The programme has offered opportunities for Spirit AeroSystems to bid for new work packages. “They are exploring dual-sourcing of certain components,” Kapoor says. “There are some bids that they've asked us for.” ■



## PRODUCT

## Flightglobal's Fleets Analyzer makes debut

**F**lightglobal has launched its brand new online data platform Fleets Analyzer, the world's most comprehensive and authoritative source of aircraft fleet data for manufacturers, suppliers, and maintenance, repair and overhaul service providers.

Inspired by the ACAS fleets database and designed to complement the Flightglobal Dashboard, Fleets Analyzer is highly intuitive and flexible, putting key data on 345,000 commercial, business, general aviation aircraft, helicopters, and military fixed- and rotary-wing types at the fingertips of industry professionals.

Refreshed daily based on updates provided by Flightglobal's team of dedicated data researchers and accessible via a web browser, Fleets Analyzer helps aerospace professionals quickly identify new business opportunities and gain a complete understanding of the global fleet.

For more information on how your business can benefit by subscribing to Fleets Analyzer, or to find out how to upgrade from an existing ACAS subscription, please visit [flightglobal.com/fleetsanalyzer](http://flightglobal.com/fleetsanalyzer) or email [fleetsanalyzer@flightglobal.com](mailto:fleetsanalyzer@flightglobal.com).

Flightglobal will over the coming months continue to release further enhancements to Fleets Analyzer, including functionality specifically tailored to meet the data needs of air finance professionals in the insurance, banking and leasing sectors. ■

## ROTORCRAFT DOMINIC PERRY LONDON

## Relentless test progress for Bell 525

**F**light-testing activities on the 525 Relentless are moving ahead rapidly, and Bell Helicopter has already flown the developmental rotorcraft with its fly-by-wire controls fully engaged.

Larry Thimmesch, vice-president of the 525 programme, said that the initial prototype has now accumulated more than 20 flight hours since its maiden sortie on 1 July, and has amassed more than 40h of ground tests.

During flights, the GE Aviation CT7-powered helicopter has been taken to speeds of up to 162kt (300km/h), an altitude of 12,000ft, and bank angles of 35°.

Bell's test pilots have also used the fly-by-wire system – what it calls “Aug On” – with the helicopter flying at 120kt and 1,200ft.



**A second prototype is scheduled to fly later this year**

Bell Helicopter

“The pilots have even taken their hands off the controls a few times, and it can stabilise itself,” Thimmesch says.

Initial autorotation trials have also been performed, with the Relentless successfully demonstrating that it can enter and recover from an autorotative state.

Thimmesch remains confident that Bell will meet and exceed its

previously stated performance targets for the 525, particularly its never-exceed speed of 165kt and useful load, currently given as in excess of 3,720kg (8,200lb).

Certification for the 9.1t 525 is targeted for the end of the first quarter of 2017. So far, Bell has taken in more than 60 letters of intent for the new type. ■

**See Feature P24**

## ASSEMBLY STEPHEN TRIMBLE WASHINGTON DC

## Robots take over 777 work

Transition to new automated riveting and bucking system begins, following successful tests

**B**oeing has started to transition a critical automation system for the 777 programme into assembly operations, even as testing of the technology continues.

As it becomes operational, the fuselage assembly upright build (FAUB) will replace a manual riveting and bucking process for the 777 fuselage with Kuka-made robotic systems, transforming the production system as the programme transitions to start building the re-engined and rewinged 777X in 2018.

Last May, Boeing officials said a representative 777 fuselage section would undergo fatigue tests, with results to determine whether the FAUB could be transitioned on the assembly floor to be made available by August.

“Testing has confirmed design requirements and the system has begun the transition to production per plan,” says Jason Clark, vice-president of 777/777X operations.

The fatigue testing over the summer was intended to validate a 60,000-cycle fatigue life of the

structure made using the FAUB: three times the normal service life of a 777. Each cycle represents a take-off, cruise and landing.

The FAUB is expected to increase productivity for the riveting process by at least 50%, and further improve over time.

It will be initially installed in a new hangar bay in Everett, Washington. That will allow 777 workers to become familiar with the new automated systems before moving the system to the main assembly line. ■



## PROPULSION

## Airbus receives its first Trent XWB-97

Airbus has taken delivery of the first Rolls-Royce Trent XWB-97 engine for the in-development A350-1000. The powerplant will shortly be installed on the airframer's A380 MSN001 flying testbed, for flight trials “in the near future”, says Airbus. It was delivered to the airframer's Toulouse headquarters from the nearby nacelle installation facility of UTC Aerospace Systems, which supplies the nacelle and thrust reverser for the Trent XWB engine series.





**Saudi An-132 on track as Antonov abandons Russia**  
**STRATEGY P10**

**THIS WEEK**

**COMBAT AIRCRAFT** JAMES DREW FORT WORTH

# Norway marks new era with first F-35

Unveiling of initial training example for Royal Norwegian Air Force starts 10-year transition to stealthy, multi-role fighter fleet

**L**ockheed Martin has unveiled Norway's first F-35A, marking the start of a 10-year effort by the Royal Norwegian Air Force (RNoAF) to phase out its F-16 fleet and achieve full operating capability with its stealthy, multi-role replacement.

The coastal nation, which shares a border with Russia, is depending on the F-35 to guard its high north region, and the Norwegian government has already committed to purchasing 22 of its 52-aircraft requirement.

RNoAF chief of staff Maj Gen Per Egil Rygg says the 22 September unveiling of aircraft AM-1 at the final assembly and checkout facility, in Fort Worth, Texas, is a significant milestone – but now the real work of bringing the F-35 into service begins.

## PREPARATION

“We’ve been preparing for this day for a long time, and now we get the aircraft. We can ship it over to [Luke AFB in Arizona] and we start flying it after some initial testing in January 2016,” Rygg said at the roll-out ceremony. “Now the work starts for the air force – the start for the next 50 years, as far as I’m concerned.”

Norway's second aircraft, AM-2, will be delivered later this



**Aircraft AM-1 will be transferred to Luke AFB in Arizona to support the service's training on the JSF**

year. In all, four examples for the RNoAF will be stationed at the multinational pilot training school at Luke AFB and the first of 48 operational aircraft will arrive in Norway in 2017 to support initial operational capability in 2019.

At the ceremony, which was aired live on television in Norway, US officials heaped praise on the country for its steadfast commitment to the multi-billion dollar fighter programme, even when development problems and cost and schedule growth – which sparked major programme

revisions in 2010 and 2011 – threatened to derail the F-35.

Norway signed up as a programme partner in 2008, and has increased its planned procurement quantities even as other nations reduced their numbers due to cost pressure.

Norway's F-35s will arrive in the baseline Block 3F configuration with the basic complement of air-to-air and air-to-ground armaments, and will be indistinguishable from the wider force except for a special drag chute modification to allow the aircraft to land on Norway's short, icy runways.

## POTENT FORCE

However, once locally-developed munitions such as the Kongsberg/Raytheon Joint Strike Missile (JSM) roll out in the Block 4 modernisation programme from 2022 to 2024, the RNoAF expects its aircraft to be among the most potent F-35s.

The JSM is an advanced derivative of the Kongsberg Penguin and NSM anti-ship missiles and a model was on display at the AM-1 unveiling.

On 15 September, Norway and Australia agreed to jointly develop the missile's seeker, and will share the aircraft integration cost if Australia decides to purchase

**“With this aircraft and this missile, we’ll have the best fighter on the globe”**

**MAJ GEN PER EGIL RYGG**

Chief of staff, Royal Norwegian Air Force

JSM for its F-35 fleet. BAE Systems Australia has been signed up to support the project.

The weapon will be carried internally on the F-35, and Oslo expects the data link-enabled stand-off-range missile to reach operational readiness in the early 2020s.

“[JSM] will enhance our capability tremendously,” says Rygg. “With this aircraft and this missile, we’ll have the best fighter on the globe because of the capabilities of both the aircraft and the missile. It gives us a totally different way of doing business in the future.”

JSM is already being marketed across the F-35 community and is a cruise-missile competitor to the Turkish SOM-J. On 16 September, Turkey's Roketsan and Lockheed signed an agreement to jointly produce the SOM-J, and first flight on an F-16 is planned for 2017. ■

## SUPPORT

### Dutch seal engine maintenance pact

The Dutch defence ministry has formalised an agreement with Pratt & Whitney to establish the first overseas F135 engine maintenance, repair, overhaul and upgrade (MRO&U) shop at the Royal Netherlands Air Force's Woensdrecht Logistics Centre.

The goal is to be ready to support F-35 operations by 2019, says P&W.

The Netherlands was selected by the Pentagon last December to support F135 heavy engine maintenance in Europe, along with Norway and Turkey.

“As we prepare for an increase in

F135 engine production, we need partners who demonstrate the high levels of technical capabilities that are required to support the F135 internationally,” says P&W military engines president Bennett Croswell.

“The Netherlands’ participation in MRO&U will ensure we have robust sustainment capability in the region.”

The Netherlands has already ordered two test aircraft, and another eight F-35s are on contract for delivery by 2019. Its total requirement is for 37 jets – while Turkey will purchase 100, to achieve initial operational capability in 2020. ■



STRATEGY TOM ZAITSEV MOSCOW

# Saudi An-132 on track as Antonov abandons Russia

Ukrainian airframer exits its joint venture with United Aircraft and turns to Western suppliers – and Middle Eastern nation

The Ukrainian government has given Antonov the go-ahead to exit a joint venture it agreed with Russian manufacturer United Aircraft in 2011.

A cabinet spokesman says the government's endorsement clears state-owned Antonov to proceed with plans for securing workload through contracts with a range of customers in third countries.

Combined production capacity of Antonov's two assembly plants in Kiev and Kharkov is 24 aircraft a year, says the manufacturer's president Mikhail Gvozdev.

"There is a possibility to increase annual output following their retooling," he adds. "This

should help us fulfil orders for 43 aircraft in our backlog.

"Our major goal now is to reorientate production and find new partners and customers abroad. We've already held a great number of negotiations to this end."

Antonov has recently secured orders for several An-148/158 aircraft from an unidentified customer in Iraq, while Azerbaijani cargo carrier Silk Way Airlines in June placed a preliminary order for 10 An-178 freighters.

Gvozdev also highlights a project to produce a new multipurpose An-132 transport in partnership with Saudi Arabia. "Design work on this type is completed,



The manufacturer has several orders for the An-158 from Iraq

first blueprints have been issued, and airframe metal-cutting is already under way," he says.

Equipment is mainly Western-sourced, with Pratt & Whitney Canada PW150 engines, six-bladed Dowty propellers and systems from Hamilton Sundstrand, Honeywell and Liebherr.

A flight-test prototype will be assembled in the second quarter of 2016, Gvozdev says. Antonov will perform the first flight and initial tests before providing the

prototype to Saudi Arabia. "Our Saudi partner will be responsible for arranging An-132 demonstration flights in regions with challenging climate conditions," Gvozdev says. "Afterwards, we'll conclude a contract and launch the type's serial production."

An-132 programme director Alexander Khokhlov does not rule out a co-operation scheme under which aircraft would be painted and components produced in Saudi Arabia. ■

INITIATIVE

## Airbus project looks to pump up fuel usage

Airbus is working on a project aimed at halving the amount of "unusable fuel" in aircraft tanks – without making structural modifications to the airframe.

The manufacturer says that widebodies typically carry "several hundred" kilogrammes of kerosene puddled in areas where it cannot be extracted by the aircraft's fuel pumps.

A team at the airframer's site in Filton, UK, has modelled a section of the A330's centre fuel tank – at a quarter of the original structure's size – to evaluate the kerosene's movement in the tank and how it can be directed to areas that can be reached by pumps.

Airbus says it foresees solutions that could be retrofitted to aircraft without "having to alter any structural components." ■

INVESTMENT GREG WALDRON BEIJING

## China outlines its African ambitions

China has broad ambitions to support Africa's regional aviation development, with its national aerospace champions set to help the continent develop the sector.

China's intentions in regard to African aviation were detailed in an extensive stand at the recent Aviation Expo event in Beijing.

Under Beijing's "China-Africa Aviation Co-operation Plan", which has the backing of Chinese

premier Le Keqiang, China aims to accomplish what it refers to as the "2123 System." By 2020, Africa will have two marketing centres for Chinese-produced aircraft, one training hub, two maintenance sites and three spare parts facilities.

So far, it has achieved some of these objectives. Marketing centres have been set up in Cameroon and Kenya, and state aerospace firm AVIC has a

training facility in South Africa. There are also maintenance support bases in the Democratic Republic of Congo and Tanzania, and spare parts centres in the former of these and Kenya.

Beijing has identified three companies which it sees as instrumental in developing Africa's aviation market: AVIC, Comac and HNA Group.

The latter, which owns Hainan Airlines, recently took a 6.2% share in South African regional carrier Comair. The relatively cheap purchase – R159 million (\$12.9 million) – marks HNA's second investment into the continent, where it already has a stake in Ghana's Africa World Airlines.

Under the plan, China's major state-owned carriers have been encouraged to launch direct routes to Africa. China also is willing to consider more partnerships with African airlines. ■



HNA Group has a 6.2% stake in South African carrier Comair





Lufthansa to trial  
broadband access  
**AIR TRANSPORT P12**

**INQUIRY** DAVID KAMINSKI-MORROW LONDON

# Unsafe load led to Bagram 747 loss

NTSB analysis concludes aircraft destroyed in Afghanistan crash was dangerously overloaded with five armoured vehicles

Investigators analysing the fatal Boeing 747-400 freighter crash at Bagram air base in Afghanistan in which all seven crew died have disclosed that only one heavy military vehicle – rather than the five that were on board – could have been safely transported.

Three 18t Cougar and two 12t M-ATV mine-resistant vehicles were loaded on the National Airlines aircraft before it crashed just after take-off on 29 April 2013. The inquiry believes the rearmost vehicle – an M-ATV – broke from its restraints, resulting in a loss of control from hydraulic and stabiliser mechanism damage.

The US National Transportation Safety Board states that the airline's chief loadmaster could have determined, by consulting weight-and-balance manuals, that the intended five-vehicle load "could not be properly secured" under the safety requirements for such equipment.

M-ATVs and Cougars were considered "tall rigid cargo", because they exceeded 96in (244cm) in height, and were subject to safeguards designed to pre-



All seven crew members died when the freighter crashed in 2013

vent them from hitting the upper deck passenger compartment during an emergency landing.

Both Boeing and Telair, which built the main-deck cargo-handling system, analysed whether the vehicles could have been transported in accordance with these special requirements.

Boeing determined that only a single M-ATV could have been carried on a centreline floating pallet within the guidelines, and that it would have to be secured by 60 tie-down straps. The study also found that none of the heavier Cougars could have been

secured because they would have to be positioned too far aft, where the vehicle would exceed the limits on main-deck floor structural strength.

Telair's analysis proved even more restrictive than Boeing's, concluding that none of the vehicles could have been safely carried because the available number of tie-down points on the 747 would have been insufficient for restraint.

Investigators found that the chief loadmaster "noted only weight-and-balance considerations" when accepting the task to

transport the vehicles, rather than exploring the need for extra precautions to secure the load.

The flight from Camp Bastion to Dubai, via Bagram, represented the first time that National had attempted to carry five such vehicles. It had previously moved Strykers, similar in size to the M-ATV, but not the larger Cougar.

While the 747 (N949CA) was able to accommodate the M-ATVs and Cougars within its weight envelope, National Airlines' procedures omitted cargo-restraint information from Boeing and Telair's manuals and contained "incorrect" restraining methods for special loads, says the NTSB.

The inquiry discovered that each M-ATV was tied down with just 24 straps, with only 26 straps used for the larger Cougars. National Airlines' own procedures would have indicated a need for 32 and 46 straps respectively.

Even though the loadmaster did not follow the carrier's procedures for securing the load, it adds, these procedures were "deficient" to the extent that the load would not have been properly restrained. ■

**MODIFICATION** DAVID KAMINSKI-MORROW LONDON

# SHARP cuts down A320neo runway requirements

Airbus is developing a modification for the A320neo which will increase the performance of the type on short runways.

The airframer is intending the performance-enhancement package to be an option on the re-engineered type, which is due to enter service this year.

Airbus embarked on the short-airfield scheme – which it has designated 'SHARP' – to assist with operations into airports including Rio de Janeiro's Santos Dumont.

Santos Dumont's runway is only 1,320m (4,330ft) in length. The airframer says it has identified a number of A320neo customers which "would like to fly"

into the airport. "[This package] will allow them to do so," it says.

Airbus says the upgrade, developed by its UK and German engineering personnel, includes a composite panel modification to the wing-root fairing that will "optimise" airflow and enable slower approach speeds.

The manufacturer used additive-layer manufacturing techniques to help produce the prototype parts.

Airbus says flight-testing of the modified section – which could be offered as a retrofit – has been "successful", and that the design is being finalised ahead of the takeover to A320neo production. ■



Upgrade includes a new composite panel on the wing-root fairing



CONNECTIVITY MICHAEL GUBISCH LONDON

# DT and Inmarsat connect for wi-fi deal

Passengers in Europe will be offered in-flight broadband through a combination of satellite- and ground-based infrastructure

Inmarsat is to co-operate with Deutsche Telekom (DT) to provide broadband access on commercial aircraft in European airspace through a combination of satellite connectivity and a ground-based mobile phone network – with Lufthansa Group in line to trial the system.

A “European aviation network” will jointly be developed to provide passengers with internet access “similar” to “high-speed broadband at home”, says DT, which argues the use of ground stations in addition to satellites will provide “cost-efficient and future-proof” solutions for



German carrier Lufthansa will trial the new service across its short- and medium-haul operations

airlines. Aircraft flying at altitudes up to 10,000ft will connect to the ground network, and

flights above that will utilise both satellites and the ground infrastructure, DT says. Cabin systems will automatically switch between these networks, with “no impact or interference” for on-board services.

Inmarsat chairman Andy Sukawaty says: “With this integrated network, we can meet the need for capacity, flexibility and quality of service, including the ability to expand quickly to anticipate growth in demand.”

Lufthansa will trial the technology from 2017. For the summer 2016 schedule, the group

will equip short- and medium-haul aircraft to provide passengers with broadband access for their digital devices via Inmarsat’s satellite services. This will include aircraft at the German mainline carrier and sister operator Austrian Airlines.

Citing “customer preference”, the group says that mobile phone calls will not be enabled via the broadband connection.

Lufthansa will be the first European network carrier to offer passengers broadband access on its short- and medium-haul flights, it says. ■

## IN-FLIGHT ENTERTAINMENT

### TAM goes wireless on A320-family fleet

Brazil’s TAM will begin offering wireless in-flight entertainment streamed to passengers’ devices from 23 September.

The Oneworld carrier says it has received approval from Brazil’s civil aviation authority ANAC to offer the IFE system on its Airbus A320-family aircraft, operating within Brazil and

South America. About a third of the airline’s A320-family fleet has been equipped with the system, says TAM. The remaining aircraft will be equipped by early 2016, it adds.

The wireless IFE system, which is free of charge, will allow passengers to stream content into their smartphones, tablets or laptops. ■

SUPPLY CHAIN FIRDAUS HASHIM SINGAPORE

# Macon is the winner as Triumph loses 747 work

Boeing will, from 2018 onwards, take over building 747 fuselage panels from Triumph Aerostructures, with the work moving to its Macon, Georgia facility.

The change will enable Boeing to make better use of its production system as military programmes begin to tail off. Work performed at its Macon site includes replacement of centre wing sections for the US Air Force’s Fairchild Republic A-10 fleet, and production of sub-assemblies for the CH-47 Chinook helicopter. Fuselage panels for C-17 transports were also previously manufactured at the site.

Boeing says defence-focused

operations at Macon will be complete in mid-2016, with the airframer investing \$80 million in the site to transition it to support the 747. Full-rate production is targeted from mid-2018.

“This is another example of how we can leverage the resources of Boeing to create greater value for customers,” says Boeing Commercial Airplanes’ vice-president and manager of supplier management Kent Fisher.

“While our initial focus is on production of fuselage panels for the 747, the Macon facility provides us a high-quality alternative for structures work currently outsourced to other suppliers. It’s also an attractive option for de-



Production of the jumbo jet will fall to one per month from 2016

veloping new airplanes.” Boeing is in the process of competitively tendering other 747 aerostructures work performed by Triumph – including manufacturing the empennage, floor beams and flight surfaces – and anticipates making the sourcing decisions by

year-end.

Backlog for the 747 stood at 29 aircraft at the end of August, according to Boeing’s orders and deliveries figures. Total production output of the iconic jet will fall to just a single aircraft per month from March 2016. ■





Brimstone target for UK Apaches  
**ROTORCRAFT P14**



San Diego-based business is working on narrowbody formerly operated by carriers including Air Malta, with flight return due in 2016

**PROGRAMME** DAVID KAMINSKI-MORROW LONDON

# PacAvi's freight expectations for A320

Passenger-to-freighter conversion company targets prototype appearance at 2017 Paris air show, as initial orders pass 40

**C**onversion specialist PacAvi is claiming initial orders for more than 40 of its passenger-to-freighter Airbus A320s, and is set to disclose launch customer details during October.

San Diego-based PacAvi formally unveiled the 'Freighter Lite' programme a year ago and is working on its prototype aircraft, MSN293, at the Haitec facility in Frankfurt Hahn. The CFM International CFM56-powered jet is 24 years old and was formerly operated by carriers including Air Malta and SmartWings.

PacAvi expects to commence test flights at the end of 2016. The company is also due to receive an A321 by October, which will also undergo cargo modification, with a supplementary type certificate covering both types.

Group chief executive Stephan Hollmann tells *Flight International* that the company has an "ambitious goal" to display the converted jets at the Paris air show in 2017.

Hollmann says it has taken orders for at least 42 aircraft with options on a further 10 pending.

PacAvi intends to detail launch customers at the Cargo Facts industry event in Miami at the end of October.

Hollmann says he is unfazed by Airbus' plans, disclosed at this year's Paris show, to resurrect a dormant freighter conversion initiative for the A320 family.

"This business is not for the [original equipment manufacturers]," he says, noting that the Airbus decision is linked to equity changes involving conversion specialist ST Aerospace at EFW.

**"If we'd had better OEM data support in the beginning, we'd have been further down the road"**

**STEPHAN HOLLMANN**

PacAvi group chief executive

He points out that, after some 20 months' work, the PacAvi team has obtained its own technical, loading and engineering data and that this effort has been "in concert" with the US Federal Aviation Administration.

"If we'd had better OEM data support in the beginning, we would have been further down the road already," he says, but insists that PacAvi is gaining back the lost time.

PacAvi's design features a 142in (3.6m) forward cargo door which is being manufactured by Saab Aerostructures.

The company is developing a relatively simple freighter in order to appeal to some 60-70% of the market "with no hassles", says Hollmann. But PacAvi is prepared to look at structural or technical changes, for customers needing greater capabilities, if there is sufficient demand.

Hollmann says, based on customer feedback, he is "absolutely convinced" that the company is "on the dot" with its strategy.

Conversion of future customer aircraft will be carried out at several facilities, such as the US-based AeroTurbine and Chinese firm GAMECO.

GAMECO is set to begin conversion of the A321 prototype, at its Guangzhou centre, in the fourth quarter. Hollmann believes the A321 offers even "higher potential" to the market than the A320.

Both types will feature a Class E cargo compartment and a main-deck manual loading system. PacAvi estimates the A320's structural payload capability at 21t and the A321's at 25t.

The company has been ad-

ressing technical issues in its design, developing a solution to avoid loader interference with the angle-of-attack sensors located in the vicinity of the cargo door. It is also sourcing additional optional features for the freighter including a surveillance camera system.

## FIVE-YEAR PLAN

Hollmann says the prototype aircraft will be retained, to be used for "consistently upgrading and improving the product", under a current five-year plan.

He says that Boeing has "dominated" the single-aisle freighter market and the A320 conversion programme will provide a new outlet for 12- to 15-year-old Airbus narrowbodies, serving as an alternative to the Boeing 757 freighter.

PacAvi has a "powerful and agile team", says Hollmann, and he claims its independence will give it greater flexibility and efficiency in the conversion market.

He is also confident Airbus, despite the relaunch of its conversion scheme, will not remain distant from the PacAvi programme, adding: "We believe we'll receive Airbus' endorsement down the road." ■



Craig Hoyle/Flightglobal/MBDA

An AH-64E could carry up to 16 of the precision-strike weapons

**ROTORCRAFT** CRAIG HOYLE LONDON

## Brimstone target for UK Apaches

British Army attack helicopter fleet could be improved with new version of RAF air-to-surface missile, MBDA believes

**M**BDA has begun promoting a future derivative of its 50kg (110lb) Brimstone air-to-surface missile to satisfy the British Army's attack helicopter weapon system requirements.

Displayed for the first time at the Defence and Security Equipment International exhibition in London from 15-18 September, the concept builds on the dual-mode Brimstone being used by Royal Air Force Panavia Tornado GR4 crews to attack Islamic State targets in Iraq.

An image of a proposed combination shows a Boeing AH-64E Apache carrying a maximum load of 16 of the precision-strike weapons. Brimstone provides a "proven capability against fast and agile land and maritime threats", MBDA said in marketing material at the show, adding the design demonstrated a combat effectiveness of greater than 98% in Afghanistan and Libya.

As part of efforts to engage with the Army Air Corps, the company has employed two former Apache

pilots to help develop concepts of operation, and demonstrated its weapon system using a cockpit simulator for the attack helicopter.

Details of adaptations to the Brimstone design for helicopter carriage have not been disclosed, but the company is planning a flight demonstration using an Apache. A production version is likely to benefit from investments in an insensitive warhead and motor ahead of the Brimstone 2's integration with the Eurofighter Typhoon later this decade.

The Army Air Corps flies a national-specific AH1 variant of the AH-64D and plans to have them replaced or remanufactured to the US Army's Block III/E-model standard.

MBDA has, meanwhile, signed a deal with BAE Systems Inc to promote the US-made advanced precision kill weapon system to European buyers. It adds a laser seeker module to a previously unguided 70mm-diameter (2.75in) rocket, for use on fixed-wing aircraft and helicopters. ■

**SURVEILLANCE** BETH STEVENSON LONDON

## Raytheon's Sentinel is eyed by overseas buyers

**R**aytheon is in talks with three undisclosed potential operators of its Sentinel R1 wide-area surveillance aircraft, five of which have been produced for the UK Royal Air Force.

A trio of export customers are being targeted in Asia and the Middle East, according to Raytheon, which declines to identify the nations. Company officials claim the Sentinel is strongly required in each, particularly for border control applications.

Interested parties are believed to include South Korea, which is modernising its inventory and last year ordered Northrop Grumman RQ-4 Global Hawk unmanned air vehicles. India has also previously shown interest.

The RAF is operating the Bombardier Global Express-derived Sentinel R1 in support of its Operation Shader commitment against Islamic State in Iraq, while the type's long-term fate is to be decided.

"For Sentinel, the pull from theatre is to keep it there," Wg Cdr David Kane, officer commanding the RAF's 5 Sqn, said at the Defence and Security Equipment International exhibition in London on 17 September.

The Sentinel's planned out-of-service date was extended from 2015 until 2018 last year and Raytheon believes the UK fleet could operate to 2025. A decision on a life-extension is expected as part of the UK's Strategic Defence and Security Review within weeks. "Within the current budget we can move out to 2025," says Roland Howell, Raytheon's head of airborne solutions.

One of 5 Sqn's aircraft is undergoing strip-down maintenance, with the work expected to take 12 months, and another is in routine maintenance. There is a planned upgrade scheduled for all five airframes, but Kane notes the current demand for the aircraft's services has added strain to the fleet. ■



Airframeimages

**ORDER**

### Thai air force purchases four T-50s

The Royal Thai Air Force has ordered four Korea Aerospace Industries/Lockheed Martin T-50TH supersonic trainers, with deliveries due by 2018. A \$110 million contract was signed on 17 September, with local media reports suggesting that Bangkok may eventually require up to 24 of the type. The Royal Thai Air Force operates 36 Aero Vodochody L-39 jet trainers, and last year secured approval to begin a replacement activity. Almost 90 T-50s are in service with South Korea's air force, with Indonesia and Iraq also operators and the Philippines another confirmed buyer.





Rapid reaction to  
Raptor strategy  
DEFENCE P17



One Air Force Reserve aircraft has completed modification to comply with New START regulations

ARMAMENTS JAMES DREW WASHINGTON DC

## Conventional shift for B-52

Global Strike Command to remove nuclear weapons fit from 30 aged strategic bombers

As the US Air Force's Global Strike Command anticipates the introduction of a nuclear-capable Long-Range Strike Bomber in the mid-2020s, it is de-arming some of its air-launched cruise missile-carrying Boeing B-52 bombers to comply with New Strategic Arms Reduction Treaty (START) limits with Russia which will come into effect in February 2018.

The command says 30 B-52Hs will be modified as conventional

heavy bombers, and a first example – from the Air Force Reserve Command's 307th Bomb Wing at Barksdale AFB in Louisiana – has already made the transition.

Remaining fleet modifications should be complete by early 2017, while the USAF also intends to revive 12 non-operational B-52Hs currently in storage at Davis-Monthan AFB, Arizona.

The air force is whittling down its nuclear-capable bomber force to around 60 B-52s and Northrop

Grumman B-2s, in line with a force mix announced in 2014.

On 1 October, the command will take control of the air force's conventionally-armed Boeing B-1Bs, giving it responsibility for training and equipping the entire US long-range bomber force.

The move will lead to 159 bombers being aligned under the Global Strike Command, including 76 B-52s – with an average age of 53 years, plus 63 B-1Bs and 20 B-2s. ■

STRATEGY ARIE EGOZI TEL AVIV

## Russia, Israel open airspace communications

Communication “hotlines” between Moscow and Tel Aviv aim to ensure that the Israeli air force can continue its operations inside Syrian airspace, despite the growing presence of Russian military personnel and equipment within the country.

Guidelines for the real-time co-ordination mechanism were decided during a 21 September meeting in Moscow between Russian President Vladimir Putin and Israeli Prime Minister Benjamin Netanyahu.

Israel is closely monitoring the Russian military build-up, with emphasis on the Syrian air force's Latakia air base. Satellite images show the recent arrival of Sukhoi Su-30 fighters and Su-25 ground-attack aircraft, along with transport helicopters and helicopter gunships. Construction activities include reinforcing runways and adding helicopter landing pads as well as building a new air traffic control tower and several other buildings.

Russia is also likely to deploy surface-to-air missile systems to protect its assets, according to Israeli sources. ■

ROTORCRAFT STEPHEN TRIMBLE WICHITA

## Bell rolls out new price promise for V-280 tiltrotor

Spirit AeroSystems rolled out the first Bell Helicopter V-280 demonstrator fuselage on 22 September, revealing much about how the team hopes to make tiltrotor technology affordable for military application.

The V-280 features innovations which improve on the technology used with the Bell Boeing V-22, including a straight wing to replace the dihedral and swept wing on the Osprey.

Bell chief executive John Garrison tells *Flight International* the most critical breakthrough is a manufacturing process intended to dramatically lower the price

point and operating cost. “That’s where the new technology is – manufacturing technology and assembly technology,” Garrison says. “We know tiltrotor. We’ve got 50 years of tiltrotor.”

“Our opportunity and our challenge is to bring that capability to a price point and target cost that makes sense for [the US Department of Defense].”

Bell has set a price point and cost target Garrison compares to a heavily-equipped Boeing AH-64E Apache or special operations Sikorsky MH-60M Black Hawk.

Affordability is a key reason Bell selected Spirit AeroSystems



Ready for transfer to Amarillo

to supply the V-280 fuselage in July 2013.

After spinning off from Boeing in 2005, its sprawling plant in Wichita, Kansas supplies advanced composite structures for large commercial widebody pro-

grammes. For the V-280, Spirit AeroSystems deployed a trademarked “Exact” rapid prototyping process, which emphasises machining to extremely tight tolerances in fabrication, avoiding the need for tooling jigs.

In another example of cost control, the fuselage was displayed on a wooden cradle costing \$2,000. It will now be transferred to Bell's plant in Amarillo, Texas, where it will be mated with vertical tails from GKN Aerospace.

The US Army will stage a two-year fly-off between the V-280 and the Boeing/Sikorsky SB-1 starting in September 2017. ■

# BEST OF ROTORCRAFT. IN ONE GREAT LIFT OFF.

Be there when we land



Changi Exhibition Centre, Singapore

Be among the biggest names in rotorcraft as we debut our arrival in Singapore. Dedicated to the thriving Asia Pacific market, Rotorcraft Asia 2016 covers the entire rotorcraft supply chain from airframes, components and parts, to avionics, safety systems, MROs and more.

Stay ahead of the competition and seize the unparalleled business opportunities in this flourishing region. Book now!

Land right here for the full view



www.rotorcrafft-asia.com

## Why Exhibit?

- Connect with **Asia's network of senior commercial and government representatives**
- Launch your latest innovations and conduct **hands-on customer demonstrations**
- Meet with potential buyers via our **Key Buyers Programme**
- Expand your **Asia Pacific footprint via this global dedicated platform**



To book your space, please contact **Lim Mei Ling / Cathryn Lee** at:  
☎ +65 6595 6113 / 6595 6114 ✉ [sales@rotorcrafft-asia.com](mailto:sales@rotorcrafft-asia.com)

Organised by:

**experia**  
events that influence

Supported by:

**EDB**  
singapore

**ie**  
Driving  
Singapore's  
External  
Economy  
Singapore

**SINGAPORE EXHIBITION  
& CONVENTION BUREAU**

Held in:

**YourSingapore**

HEART OF AVIATION  
**singapore**





Diamond nears first delivery of DA62 piston-twins to unnamed operators  
**PROGRAMME P18**

DEPLOYMENT JAMES DREW WASHINGTON DC

# Rapid reaction to Raptor strategy

Fast-response method to get fighters airborne worldwide within 24h will be emulated with other US Air Force types

The US Air Combat Command's (ACC) recently conceived "Rapid Raptor" method for quick-reaction fighter deployments has proved so successful with the Lockheed Martin F-22 that it could be extended to other airframes.

"We're working on 'Rapid Next'," ACC chief Gen Herbert Carlisle told the US Center for Strategic and International Studies in Washington DC on 18 September. "If we have US air power show up in places and at times people don't anticipate, that has a great effect for assuring friends and partners, and has a deterring effect on adversaries and aggres-

sors." The current method – which saw aircraft deployed to Spangdahlem air base in Germany in late August and visit Amari air base in Estonia on a training deployment – pairs four F-22s plus a detachment of pilots, maintainers, fuel and weapons with a Boeing C-17 strategic transport and tankers for self-contained, rapid global deployments within 24h. The aircraft which visited Europe were drawn from Tyndall AFB, in Florida.

The technique – which was also used during a recent deployment to the Asia-Pacific region – could help the US Air Force to



Four F-22s were deployed to Spangdahlem air base in Germany

meet more of its operational commitments around the globe, even as its combat force shrinks.

Carlisle notes the USAF's future fleet of Boeing KC-46 tankers, which will also carry cargo, will play a significant role in the rapid deployment strategy, alongside the C-17.

Meanwhile, Carlisle says directed energy weapons, such as

high-power microwave emitters and lasers, could be used to disable surface-to-air missile sites in the not-too-distant future, with defensive and offensive laser weapons "not as far away as some people think".

"By 2020 we have a chance to be there. We're working on getting it into a podded solution for a fighter-sized aircraft." ■

UNMANNED SYSTEMS BARTOSZ GLOWACKI WARSAW

# Hermes pairing proposed for adaptation in Poland

Elbit Systems and the Polish Armaments Group (PGZ) have signed a co-operation agreement concerning the proposed delivery of a medium-range tactical unmanned air vehicle based on the former's Hermes 450 to the Polish armed forces.

The companies will submit a joint proposal to the armaments inspectorate of the nation's defence ministry for the "Gryf" requirement, with PGZ as the prime contractor.

Elbit will provide the necessary transfer of technology, with the manufacture of the main components and final assembly of the UAV to be performed in



PGZ will prime offers with the tactical 450 and larger 900 model

Poland. The Israeli company also will help PGZ to establish a development and integration laboratory, as well as a 'Polonised' version, to be offered for export.

"In co-operation with Elbit, Polish companies will be able to develop worldwide unique ex-

pertise in these fields," says Elbit vice-president Elad Aharonson.

The new agreement also covers offering the larger Hermes 900 to meet Warsaw's "Zefir" medium-altitude, long-endurance UAV requirement, with this to share infrastructure with their Gryf pro-

gramme candidate.

Meanwhile, a new Polish consortium will be formed in late September to develop technologies including a datalink, mission computer, software and electro-optical sensors for the nation's future tactical UAV. Participants include Mesko, PIT-RADWAR, WZE Military Electronic Works and the WZL-2 depot.

The PGZ/Elbit team faces competition from rival systems including a Thales and WB Electronics-promoted version of the British Army's Watchkeeper UAV, which was also derived from the Hermes 450 platform. ■

**Download the 2015  
World Air Forces Report**  
[www.flightglobal.com/waf](http://www.flightglobal.com/waf)

IN ASSOCIATION WITH  
**Together  
ahead. RUAG**



PROGRAMME KATE SARSFIELD LONDON

## Diamond nears first delivery of DA62 piston-twins to unnamed operators

**D**iamond Aircraft is preparing to deliver the first DA62 piston-twins in October, to two unnamed German owners.

The first five customer aircraft – serial numbers 5 to 9 – are destined for European operators, says Christian Dries, chief executive of the Austrian airframer. Serial number 10, under construction at Diamond's Weiner Neustadt headquarters, is the first DA62 built for the US market.

"We will be taking this aircraft to the NBAA convention in No-

vember, where it will be promoted as a platform for corporate and charter operations," says Dries.

The DA62 will remain in North America as a customer demonstrator for Diamond Aircraft Canada.

Dries points out the US version of the all-composite DA62 is heavier than the model for the European market. The smaller variant, he explains, seats five and has a maximum take-off weight (MTOW) of just under 2,000kg (4,400lb). "This model is

ideal for Europe," Dries says, "as aircraft over this weight are subjected to Eurocontrol fees."

European Aviation Safety Agency certification for the €960,000 (\$1.07 million), 1,300nm (2,430km)-range version was secured at the Aero Friedrichshafen business and general aviation show in April.

The larger DA62 – which is awaiting US approval – is equipped with seven seats, has a MTOW of 2,300kg and a 1,280nm range. ■



Diamond Aircraft Industries

AE300 engines power the type

STRATEGY MURDO MORRISON ABU DHABI

## Al Jaber announces move into MRO

Abu Dhabi-based operator plans joint venture with European firm to provide maintenance for Airbus and Boeing twinjets

**A**l Jaber Aviation (AJA) is the latest Gulf operator to plan a move into maintenance, repair and overhaul (MRO) services as it strives to broaden its offering beyond the highly competitive business jet charter market.

The company, based at Abu Dhabi's Al Bateen airport, is in negotiations to form a joint venture with a "well-known European MRO provider" to open a hangar at the downtown business aviation facility, says chief operating officer Mark Pierotti.

The 300m<sup>2</sup> (3,230ft<sup>2</sup>) facility – which will provide light maintenance

to airline and business aviation operators of Airbus and Boeing narrowbodies, as well as Embraer and Hawker jets, is earmarked to open in early 2018.

AJA will pursue a "10-year plan to take us up to major checks, as well as overhauls, although not completions", says Pierotti.

He says Etihad Airways' purchase from Mubadala of the former Abu Dhabi Aircraft Technologies, to serve as the airline's engineering department, has created a "gap in the market" for local services.

He adds: "At the moment, a lot

of narrowbodies go out of the country for maintenance."

AJA was founded in 2007, the third in a trio of locally-owned, high-end business aviation charter providers in Abu Dhabi, with Royal Jet and Falcon Aviation. It has ramped back plans to acquire an extensive fleet of Airbus and Embraer corporate jets and instead offers an Airbus ACJ318 Elite and Embraer Lineage 1000, as well as a Hawker 800XP, under its Sky Limo sub-brand.

AJA is also moving into aircraft management and operates an aviation consultancy and training

joint venture called Avis Gulf. "VIP charter is no longer enough," admits Pierotti. "The charter market is extremely competitive. We need multiple revenue streams."

Falcon Aviation is due to open the Middle East's first VIP jet completion centre by year-end.

The 13,700m<sup>2</sup> development, which Falcon announced in 2014 and which will be capable of housing an Airbus A380, is under construction at Dubai World Central airport. Falcon already operates an MRO facility for helicopters and smaller business jets at its Al Bateen base. ■



Sierra Industries

SkyStep for Cessna's light jets

ENHANCEMENT KATE SARSFIELD LONDON

## A step up in stair style, says Sierra

**U**S engineering company Sierra Industries is targeting year-end certification for its new airstairs, designed for Cessna's large family of out-of-production Citation light business jets.

SkyStep is being touted as an alternative to standard stairs – designed and supplied by Cessna – and can be retrofitted at a cost of \$14,000 at Sierra's facilities in

Uvalde, and San Antonio, Texas. "We are simply reacting to customer demand," says Sierra's manager of creative marketing, Jim Gerrish. "Many owners of these older light jets have been asking for longer and more solid airstairs for some time. So we've designed them."

SkyStep has significant improvements in functionality and

appearance over the original, Sierra says, including three "evenly spaced" enclosed steps – compared with Cessna's two-step, open-tread design. The SkyStep is targeted at owners and operators of the approximately 2,500 twin-engined Citation V, Ultra, Encore, CJ1, CJ2 and CJ3 business jets in use worldwide, says Gerrish. ■





Airbus influence helps  
to shape supersonic  
AS2w  
NEWS FOCUS P20

UPGRADE KATE SANSFIELD LONDON

# LHT points to split-tip first

Maintenance provider completes initial installation of wing-tip modification for VIP airliner

German maintenance, repair and overhaul provider Lufthansa Technik (LHT) has become the first European company to install Aviation Partners' new split scimitar winglets on a Boeing Business Jet.

The modification took 10 days and follows European Aviation Safety Agency approval for the aerodynamic wing-tip – developed by Aviation Partners and Boeing. The retrofit involves replacing the BBJ's winglet tip caps with an aerodynamically-shaped 'scimitar' tip cap, and adding a smaller, similar-shaped ventral strake.

LHT says to fit the scimitar tips, its engineers had to "reinforce areas inside the aircraft structure,



Aviation Partners says split scimitar winglets boost range by 2%

particularly in the wing tanks".

Aviation Partners launched the retrofit programme two years ago for owners and operators of 737-derived VIP airliners. The feature is standard on new BBJs.

The winglet reduces drag on

long-range flights and boosts range by a claimed 2% – as much as 120nm (220km).

"The upgrade gives a BBJ with seven auxiliary fuel tanks the range of an eight-tank airplane," Aviation Partners says. ■

LUXURY TRAVEL  
NIALL O'KEEFE LONDON

# Etihad bolsters suite of services with charter offer

UK business aircraft charter specialist Chapman Freeborn will promote premium cabins aboard Etihad Airways' Airbus A380s to its clientele, as part of a deal with the Abu Dhabi carrier.

Chapman Freeborn says guests travelling in "The Residence" – a three-room suite – and the "First Apartment" – will be able to charter a private jet for onward travel. The offering includes the ultra-long-range Gulfstream G650, long-range Dassault Falcon 7X and super-midsize Bombardier Challenger 350.

Etihad operates A380s on three daily services to London Heathrow and one of two daily services to Sydney. ■

Visit us at booth N4306 at NBAA Business Aviation Convention & Exhibition • Las Vegas, NV – November 17-19

## Universal ARINC 429 to Discrete Signal Converter Including ADS-B Out Applications



Manufactured by Aerospace Optics, Inc.

No Software • No Firmware

Off-The-Shelf Solution



ADS-B Out

Communications

WiFi

Diagnostics

IFE Status/Control

[www.nexsysavionics.com](http://www.nexsysavionics.com)

From the manufacturer of the best-in-class VIVISUN® line of pushbutton switches comes the new NEXSYS ARINC 429 to Discrete Signal Converter (SR429). This unique interface solution contains no software, firmware or programmable logic and is tested to DO-160 and equivalent MIL-SPEC standards. For maximum flexibility, the SR429 is available as either a factory preset unit or as a universal (user configurable) unit. The SR429 is ideally suited to support the ADS-B mandate and can be used in any application requiring an ARINC 429 to discrete interface.

For more information, visit us online or call toll-free at 1-888-848-4786.

© 2015 Aerospace Optics, Inc.



DESIGN STEPHEN TRIMBLE WICHITA

# Airbus influence helps to shape supersonic AS2

European manufacturer helps Aerion to assess key design traits, but engine selection and noise rules slow progress

**A**erion's planned production system for its AS2 supersonic business jet is evolving as Airbus's role in the programme begins to deepen.

At last year's NBAA convention it was revealed that Airbus had agreed to partner with Aerion, giving the supersonic project its long-sought major OEM partner. The original disclosure involved only the Airbus Defence & Space division, but the airframer's commercial group has already become involved, Aerion vice-chairman Brian Barents revealed on 21 September at the Wichita Aero Club – where he delivered the first major programme update since the EBACE business aviation show in May.

In particular, notes Barents, the Airbus engineering centre in Wichita is participating directly, with that facility's director John O'Leary attending an internal programme review at Aerion's offices in Reno, Nevada, during September.

Aerion also plans to leverage

Airbus's network of major component assembly fabrication plants in Europe for the construction of the AS2, but final assembly will take place in the USA, Barents says. The target location is a site with access to a deepwater port to receive the major sub-assemblies from Airbus's plants in Europe, he says.

## FAMILIAR FEEL

The set-up is not unlike the concept for the A320 final assembly line now operational in Mobile, Alabama, which is located less than four miles (6.5km) from a deepwater port. Airbus also ships another major component assembly – the Section 15 centre fuselage for the A350 – to France from a Spirit AeroSystems factory in Kinston, North Carolina.

When Airbus disclosed its involvement, it was not clear how much influence it would bring to bear on the design of the supersonic aircraft.

But Airbus officials have already taken a firm position on a

key design point for the AS2. Aerion preferred to design the aircraft with a composite fuselage, but Airbus is pushing its new partner to rely on a more conventional metallic structure.

"We were leaning towards composites," says Barents. "Since collaborating with Airbus, they're kind of trying to convince

us that a metal fuselage will be the best way to go."

Airbus Group chief executive Tom Enders said in an interview earlier this year that supersonic travel was a long-range objective for the group, telling a French journalist in February that he envisions a distantly future Airbus aircraft that could fly from Paris



GE Aviation, Pratt & Whitney and Rolls-Royce are competing to propel the planned supersonic jet and a clear favourite has emerged





Recovery mode  
FEATURE P23



The engine chosen to power the AS2 needs to generate sufficient speed within permissible community noise limits

to Sydney, Australia, in 2h. Despite those long-term ambitions, Airbus has never described its partnership with Aerion as a stepping stone to a supersonic transport. Aerion, however, believes its key technical breakthrough – a supersonic natural laminar flow wing – will be scaleable to a “small airliner” that could be introduced within 10-15 years, Barents says.

That said, Aerion officials believe a different technical quality of the AS2 drove Airbus to become involved in the project. Believing US regulators would not soon lift the ban on overland supersonic flight, Aerion designed its wing to cruise most efficiently at both Mach 1.5 and subsonically at M0.95, which is one-tenth of a Mach number faster than any current airliner.

“They really have no interest in supersonic transportation, but they do have interest in the natural laminar flow technology as it relates to high subsonic regimes,” Barents says. “One of our sweet spots is M0.95. As they look at commercial applications years

from now, they want access to our technology.”

Meanwhile, Aerion has asked US and international regulators to create a special community noise standard for supersonic aircraft. Any relief would help the company reach its newly extended range goals for the AS2 but, Barents says, may not be necessary to get the supersonic aircraft certificated, depending on how an ongoing engine selection process is resolved.

#### DECISION TIME

The engine selection process was due to wind up by the end of this year, but is now set to continue into 2017, Barents says.

All three potential suppliers – GE Aviation, Pratt & Whitney and Rolls-Royce – are participating in the selection process, with both military and commercial engine cores in consideration. The supersonic application requires a rating of about 16,000lb-thrust (71.2kN), but with a core size typical of much larger engine thrust categories due to the high-speed requirement. That is likely

to eliminate an emerging class of business jet engines, such as GE's Passport, the Pratt & Whitney Canada PW800, R-R's BR725 and the Snecma Silvercrest.

An unnamed engine candidate has emerged as an early favourite, Barents tells *Flight International*. It may be capable of meeting the demanding requirement for supersonic cruise speed along with new regulations set to take effect in 2020 limiting take-off noise made by aircraft in communities adjacent to airports, he says. Barents does not identify the company or engine, but does clarify an adaptive bypass airflow system is not needed to meet the noise and speed requirements.

The trijet AS2 redesign that Aerion revealed in May 2014 remains the company's default configuration, but a twin-engined aircraft has not been ruled out.

The engine selection process will determine whether the first AS2 moves into production, according to Barents.

The global financial crisis in 2008 did not claim Aerion as an immediate victim, but the supersonic aircraft project is still subject to the lingering effects of the ill-timed recession.

The partnership with Airbus solved only one of Aerion's long-term needs: strong support from a major manufacturer for certification and manufacturing, while injecting a new level of credibility in the project.

The 2008 recession, however, extended early development by several years, as potential industry partners seemed more focused on survival than expanding into supersonic territory.

By 2014, those delays caught up with the programme's regulatory standing.

Aerion's plan to power the jet with a pair of P&W's proven JT8D engines suddenly appeared vulnerable, as ICAO adopted new community noise regulations to take effect in 2020 that will disqualify using the powerplant for a supersonic application.

That step has led to Aerion's ongoing process to select a new engine, which, Barents says, is focused on selecting a design that can meet the supersonic speed

goal with a 5,000nm (9,250km) range, along with the new community noise standards.

But Aerion is seeking relief from the new standards anyway. ICAO's current regulations allow a Boeing 747-400, for example, a higher noise threshold than a twin-engined 777, Barents says, as a result of an exclusion process based on economic viability. A higher-gross-weight 757-300 also is allowed to emit more noise on take-off under ICAO regulations than a 737, he adds.

### “The new generation of low-boom supersonic jets will not get off the ground”

**BRIAN BARENTS**

Vice-chairman, Aerion

So Aerion is asking the US Federal Aviation Administration and ICAO to create a new standard on community noise for supersonic aircraft, Barents says.

“Such a new standard would enable the development of supersonic aircraft that are aerodynamically efficient, minimise community noise emissions, and be consistent with maintaining economic viability,” he says.

But the regulation could benefit Aerion's potential rivals even more than its own aircraft. The AS2 is being developed to cruise efficiently at M0.97 overland, but others, including NASA, are pursuing “low-boom” supersonic aircraft, which use aerodynamic shaping to muffle the noise created by a sonic boom. Such a design would require the US government to amend a law banning any supersonic flight by civilian aircraft over populated areas.

In Barents's view, however, the aerodynamic penalties imposed by the low-boom shape also would render it infeasible to comply with the new community noise regulations.

“The new generation of low-boom supersonic jets will not get off the ground due to community noise rules – and I mean that quite literally,” he says. ■

The key players in aviation rely on us for the most trusted, reliable and timely fleet data, intelligence and insight when they need it most.

## Introducing Flightglobal Fleets Analyzer

One simplified, online platform designed with flexibility and built upon an unmatched level of quality data.

Find the next deal in aviation and quickly access the most comprehensive view of the global fleet anytime, anywhere.

*Request your trial today.*

Visit [flightglobal.com/fleetsanalyzer](http://flightglobal.com/fleetsanalyzer)

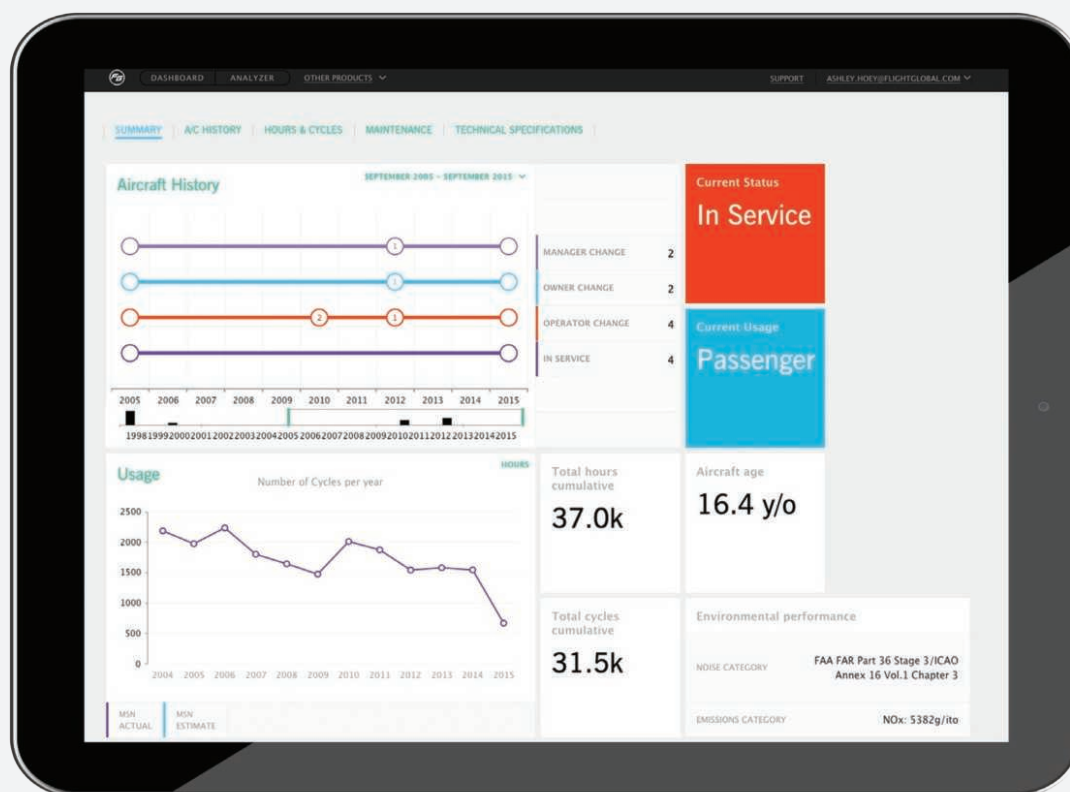


Illustration shows conceptual data only





Andrew Parsons/Rex Shutterstock

London's Air Ambulance – one of several such charities in the UK – is set to acquire a second MD902 to expand its operations

# RECOVERY MODE

As the civil helicopter industry prepares for its annual European gathering at the Helitech show in London, it does so against a backdrop of falling sales and a troubled offshore oil and gas market. Nonetheless, optimism still persists, with a number of new programmes under way

## CONTENTS

- 24 **State of play** Market overview
- 30 **Swiss precision** Marengo Swisshelicopter
- 32 **London calling** London's Air Ambulance
- 34 **Safety first** Helicopter accidents



SKYe SH09 (top) is a new light contender. Accidents analysed to prevent recurrence



Super-medium helicopters like the H175 are being touted as a means of right-sizing operations

# LIFTING THE STANDARD

Helicopter manufacturers may be suffering from a sales downturn in 2015, but they are using the time to deliver a plethora of new and improved rotorcraft to the market

**DOMINIC PERRY** LONDON

It is a curious time for helicopter manufacturers. While product development and improvement continues at the majority – at least five Western clean-sheet programmes under way at the big three airframers – the industry is undeniably suffering a downturn.

Initially this was largely confined to the lighter end of the market in the parapublic and utility sectors, with sales of heavier helicopters remaining strong – particularly for the oil and gas market. However, with crude prices sharply down – and now forecast to stay that way for longer than initially anticipated – companies across the segment have been reining in their spending.

To provide an illustration of the pain this has caused to those on the front line, it is worth noting comments contained in the most recent quarterly filing from global offshore operator CHC Helicopter.

**“A rapid downturn in market conditions appears more prolonged than expected”**

**CHC HELICOPTER**

CHC highlights the “significant and rapid decline” in Brent crude prices since mid-2014, which have led to a “rapid downturn in market conditions” and “now appear more prolonged in nature than initially expected”. Customers have been managing costs, CHC says, which has “translated into increased pricing pressure on us” and in the long term, the volatility “could negatively impact the future demand for offshore helicopter transportation services”, it notes.

“Though the majority of our revenue is derived from contracts tied to our oil and gas customers’ offshore production operations, which provides the company with a more stable revenue stream since the production business is typically less cyclical in nature than the exploration and development business, this trend, if sustained, could have a significant adverse effect on our business and financial conditions that we may not be able to fully recover from.”

## TOUGH BACKDROP

At the same time, CHC announced \$169 million of order cancellations, without naming a type or number, and said it would also return 11 leased aircraft. Of course, the company was not in particularly rude health prior to the oil price plunge, but those quotes do not differ markedly from those of its peers.

It is against this tough backdrop that the industry finds itself. Precisely what impact it is having is hard to quantify, given the lack of



transparency in the airframers' orderbooks. However, both AgustaWestland and Airbus Helicopters – and to a lesser extent Bell Helicopter – are forecasting lower full-year deliveries in 2015 than they recorded in 2014; figures already down on the previous 12 months. Sikorsky, distracted as it has been, has not offered a forecast.

Airbus Group chief executive Tom Enders warned on 31 July that the state of the oil and gas market was “not helping” the medium and heavy segments at its Airbus Helicopters division. Similarly, its European rival AgustaWestland reported a moderately worse financial performance in its first half, partly blamed on the “performance of the oil and gas sector”.

Chris Wills, valuations manager at Flightglobal's Ascend consultancy, says it has recorded 10 heavy helicopter cancellations this year, with the offshore fleet growing by just six aircraft in 2015.

The two heavy helicopters in the segment, the Airbus Helicopters H225 and Sikorsky S-92, have been most affected, seeing a number of order deferrals and cancellations. Rotorcraft manufacturers are better able to flex production than their fixed-wing counterparts and, anecdotally, both have trimmed output this year. Airbus Helicopters has the additional benefit of being able to switch some output to the defence market thanks to the success of the H225M military variant, a luxury that Sikorsky does not enjoy with the S-92.

But despite, or perhaps even because of the weakness in offshore transportation, Airbus Helicopters is pushing ahead with the initial development of its eventual H225 replacement, the X6.

Launched at the Paris air show in June, the airframer has entered an early two-year defi-



**Bell is aiming to secure certification for its light single 505 Jet Ranger X by the end of the year**

inition phase for the new rotorcraft, with its intention to achieve service entry around 2022-2023. Little has so far been revealed about the X6, save for the manufacturer's commitment to deliver a step-change in performance, efficiency and safety.

#### FLY-BY-WIRE

Images released at the launch suggest a rotorcraft with a highly aerodynamic shape and featuring five-blade main and tail rotors. It will be equipped with new engines in the 3,000shp (2,240kW) class, although no decision on a supplier has yet been made. The one detail that has been confirmed, however, is the inclusion of fly-by-wire controls on the grounds of improved safety and capability.

The France-headquartered firm is banking on the oil and gas market being on the upward part of its cycle as the new model arrives, fueling a need for fleet replacement.

In the meantime, Airbus Helicopters is working on an enhancement to the current H225. Intended to make its service entry in 2016, it will feature uprated Turbomeca Makila 2B engines, taking maximum take-off weight (MTOW) to 11t and improving range with 19 passengers on board to 190nm (352km), from 140nm.

Sikorsky too, has developed a higher-gross-weight version of the S-92, increasing MTOW by 544kg (1,200lb) to 12.5t. Available as line-and retrofit options, the first example was handed over to operator Era Group in August. Sikorsky expects certification of the retrofit kit to be obtained by year-end. Uprated GE Aviation CT7-8A6 engines for better hot and high performance will be available from 2017.

Of course, Sikorsky has been distracted of late while its future was sorted out, but a pressing matter for its new owner, Lockheed Martin, will be to decide on a future roadmap for the S-92. The move by Airbus Helicopters to launch the X6 only serves to illustrate the need for a further enhancement of Sikorsky's flagship civil model.

As a research paper from Ascend notes, although Sikorsky will continue to take orders for the S-92 with or without an update, increased competition will erode its sales figures. “It is this share which Lockheed Martin needs to decide if it wants to fight for. If it was simply to continue production of the S-92 it would still take a sizeable part of our forecast, but we would expect to see a reduction of market share if no new derivative or whole new type was produced.”



**The 4.6t AW169 is expected to compete strongly against the AS365/H155 Dauphin**

» One further effect of the difficult oil and gas market has been that manufacturers and operators have been extolling the virtues of the new super-medium-class helicopters as a means of right-sizing aircraft to take into account lower load factors. Or, to put it another way, what might have been profitable in a half-full 19-passenger helicopter with crude at \$100 a barrel is markedly less so with the oil price down by 50%.

### CUSTOMER INTEREST

Both Airbus Helicopters and AgustaWestland argue that their respective H175 and AW189 super-mediums, each able to accommodate 16 passengers, are more efficient for a large percentage of missions than heavier rotorcraft, while simultaneously being more competitive than those in the weight class below. Longer-range variants of both types are also in the works, with AgustaWestland confirming customer interest in its model.

New designs, engines, and avionics aid safety and lower operating costs too, they argue. Sales of both have been reasonable this year, considering the broader environment. That said, AgustaWestland's deal with Russian oil giant Rosneft for as many as 160 locally-assembled AW189s, plus an undisclosed investment in the manufacturer's Moscow-based HeliVert joint venture, appears potentially valuable in the longer term. But with only 10 firm orders from the deal so far, its rivals have been quick to question whether the full complement will ever be built.

Russia has posed its own set of problems for Airbus Helicopters, with the status of UTair's acquisition of 15 H175s still very



**AgustaWestland is seeking to bring its AW609 civil tiltrotor into service by 2018**

### "Right-sizing could benefit all the super-mediums as they have competitive costs"

**CHRIS WILLIS**

Valuations manager, Flightglobal Ascend

much in doubt. Nonetheless, the programme is in positive territory this year, having seen Bristow Group, in March, more than triple its commitment for the type to 17 and lessor Milestone Aviation, at the Paris air show, in-

crease its total orders and options for the type to 28. Milestone had a busy Le Bourget, in fact, also signing a letter of intent for 20 examples of the third super-medium on the market, the Bell Helicopter 525 Relentless.

Still at the development stage, the 525 performed its first flight on 1 July, and has since amassed 20 flight hours as well as 40h of ground runs. Trials have included the incremental introduction of its full fly-by-wire control system at 120kt (222km/h) and 1,200ft. Two further prototypes are in final assembly and should roll out by the end of this year.

**FINANCE DOMINIC PERRY LONDON**

## DIVERSIFIED PERSPECTIVES ON THE HELICOPTER LEASING MARKET

A LOT has changed since the helicopter leasing market began to take off a couple of years ago.

For a start, the number of lessors has proliferated. A sector that began with two initial companies – Lease Corp International (LCI) and Milestone Aviation – was soon bolstered with a third in the form of Waypoint Leasing, with Macquarie Rotorcraft Leasing and Lobo Leasing following later.

That picture became still more complex following the January 2015 acquisition for \$1.78 billion of Milestone by fixed-wing leasing giant GECAS, instantly giving the Dublin-based lessor – brainchild of former NetJets supremo Richard Santulli – the leverage and reach its rivals can only dream of.

In the background, the market has also altered. Initially, most operating lessors were heavily weighted towards providing those serving the offshore oil and gas market with medium and heavy helicopters – notably the Airbus Helicopters H225 and Sikorsky S-92. But now the oil price has plummeted there is overcapacity in the sector, and operators are desperate to reduce costs.

### REPLACEMENT CYCLE

Mike Platt, chief executive of LCI, says that although it has seen a slowdown in the replacement cycle at operators, there has been relatively little impact on its day-to-day business. This is in thanks to it being less exposed to the heavy end of the segment, with an orderbook predom-

inantly comprising medium- and super-medium-class helicopters.

"We are not seeing big cutbacks by any stretch of the imagination. But there is a slowdown in the replacement cycle," he says. And

### Washecka has long predicted a period of consolidation and that view is unaltered

even in regions – the North Sea, for instance – where the slowdown is most marked, "we are seeing pockets of activity", continues Platt.

However, he does think the market is shifting: "What's really

changed over the last 18 months for all leasing companies is that we are all diversifying."

So, rather than simply having its gaze fixed offshore, LCI now has clients in the emergency medical services (EMS), search and rescue, and renewables industry sectors. It also now engages in sale and lease-back transactions with operators.

"We continue to diversify so that during these temporary changes we won't see such a big impact on our fleet. It has been a concerted effort by us and we see others doing the same thing," he says.

Waypoint, which recently secured market investment of \$200 million, has committed part of its orderbook to the EMS market and expects to deliver its first Airbus Helicopters





AgustaWestland

Bell is banking on the oil and gas market regaining lift just as the 525 enters service in the first half of 2017. It also believes that the Relentless, tipping the scales at almost 9.1t, can be even more successful than its super-medium rivals in chipping away at the market for helicopters in the weight class above.

"We were concerned that the 525 could be too late to market, but the current market environment has helped reduce any gap the H175 and AW189 had," says Ascend's Wills.

"We also see the market looking to right-size operations and this could benefit all the

super-mediums, especially as they have competitive operating costs," he adds.

In fact, Ascend estimates that around one-third of 525 deliveries will be destined to take on missions previously operated with heavier helicopters.

It is also a philosophy that both Airbus Helicopters and AgustaWestland have bought into, albeit further down the weight range. The recently certificated AW169, which boasts a MTOW of 4.6t, has long been billed as the "Dauphin killer" in reference to its likely effect on the rival AS365/H155 Dauphin models, which weigh in at 4.5/4.9t.

## SYSTEM MATURITY

To some extent the slow death of the Dauphin family was already under way, with the heavier and significantly more powerful AW139 largely to blame. Now Airbus Helicopters has responded with its own "AW139 killer", the H160. Officially unveiled in March at the HeliExpo show in Orlando, Florida, the airframer aims to take on the bigger helicopter by offering a platform which matches its performance but weighs around 1t less. Certification and service entry are scheduled for 2018 with the first flight successfully completed on the eve of the Paris show, in mid-June.

The H160 marks a significant change from initial designs floated during its X4 design concept phase, which envisaged fly-by-wire controls, two iterations of cockpit displays and a unique fuselage shape. However, Airbus Helicopters elected to pursue simplicity and system maturity rather than complexity for the development, based on a fear of pro-



Airbus Helicopters

## Airbus officially unveiled its H160 in March

gramme overruns and through feedback from its customer advisory panel.

The other significant change over earlier designs is the reduction in engine choice, with the manufacturer ditching the 1,100shp Pratt & Whitney Canada PW210 turboshafts to leave Turbomeca's developmental 1,200shp Arrano as the sole engine choice. Due to the late decision to drop the P&WC powerplant, flight tests commenced using the PW210, however Turbomeca aims to deliver its first production Arrano to the airframer before year end, with first flight in early 2016, likely to coincide with the arrival of the second prototype.

AgustaWestland's response to the H160 was immediate, though, announcing an op-



Lease Corp International

## LCI has a number of AgustaWestland AW139s on its books

H145 to a customer later this year, says chief executive Ed Washecka.

Although Washecka acknowledged that despite there being lower

demand for oil and gas helicopters, thanks to manufacturers reining in production, "there are still opportunities for lessors.

"We try to show operators the benefits of having a diverse capital structure – a mixture of owned, leased, and financed helicopters," he says. The exact proportions of that mix are down the individual operator to decide, he adds.

## COMPETITIVE MARKETPLACE

Waypoint is largely unperturbed by GECAS's arrival in the market, believing that having two big firms in the space means that it helps customers to "ensure they have a competitive marketplace".

Platt also plays down the significance of the deal: "Milestone was the big guy on the block, before and after GECAS," he notes.

He also believes operators are yet to fully exploit the potential of

fered by the lease market. In the fixed-wing world, around 50% of the fleet is leased, he says, compared with 5-6% at the heavy end of the helicopter market.

"I think over time, the question is how much it will nudge up into the 40-50% range," says Platt.

"Operators are not in the business of taking residual risk on helicopters or remarketing equipment. That's what we do. People naturally migrate to their areas of expertise as that's where they make the best returns."

As for the future, Washecka is cautious. He has long predicted consolidation of the industry and is yet to alter that viewpoint. "There is not room for everybody in the helicopter leasing space. That becomes more true going forward," he says. ■

» tional 600kg weight increase for the AW139 to 7t MTOW – 200kg more than the current 6.8t maximum – plus a 100kg weight saving on the baseline aircraft. Although deliveries of the variant have begun, it remains to be seen whether the AW139 can maintain its popularity in the face of the H160's potentially significant performance gains.

### DEVELOPMENT EFFORTS

Also in AgustaWestland's product pipeline is an aircraft that presently has no clear competitor – the AW609 civil tiltrotor. The manufacturer is continuing its development efforts on the 8.2t type, with a third flight-test aircraft due to join the fleet in late 2015, initially to focus on icing trials. This will be followed by a fourth test article – currently in build at the airframer's Philadelphia, Pennsylvania facility – which will feature the first production cockpit.

US Federal Aviation Administration certification is scheduled for 2017 under a new Powered Lift category that draws on elements of both fixed- and rotary-wing requirements. With 1,300h of flight time amassed so far, including trials of auto-rotation and glide landings, AgustaWestland is confident it can meet its deadline for 2018 service entry.

The question for the Anglo-Italian airframer is what comes next. Ascend's Wills believes the immediate imperative is to ensure the AW169 and AW189 are brought to market effectively “particularly the latter, when compared with the relatively seamless service entry of the H175”.

Further out, development of a helicopter in the weight range between the 8.3t AW189 and 15.6t AW101 is possible – parent company Finmeccanica has previously indicated an intention to bring out a 10.5t helicopter – “but it



Era Group is the first operator of the new higher-gross-weight variant of the S-92

would certainly depend on Sikorsky's move as well as the market in general”, says Wills. However, he believes AgustaWestland would have little appetite for such a programme.

Meanwhile, Bell continues to advance on certification and service entry for its light single 505 Jet Ranger X, with the former milestone due to be achieved by the end of 2015. Its full complement of three test vehicles is now flying, with the third having joined the fleet on 16 July. In an update posted to its website on 1 September, Bell says the three helicopters have now accumulated a total of 330 flight hours.

The initial prototype (C-FTVI), which Bell describes as the “workhorse” for the certification effort, had logged 250h since its November 2014 first flight. It has completed hot and high testing, and its final evaluation will be a 100h endurance ground run later this year. FTV2 (C-FTVN) has amassed 60h, and will validate the type's cold weather performance.

### Bell Helicopter continues to advance on certification and service entry for its light single 505 Jet Ranger X

Lastly, FTV3 (C-FTVO) – which is configured with optional kits including a terrain collision avoidance system and air conditioning – has flown for just 20h and is currently undergoing certification noise and handling qualities testing. Function and reliability testing will follow later this year.

Bell has passed another milestone on the programme, with the late August opening of its new assembly line, in Lafayette, Louisiana. It also has received the first production Turbomeca Arrius 2R engine, with certification of the powerplant scheduled for year-end. ■



The first prototype of Bell Helicopter's 525 made its first flight on 1 July. it has now amassed 20 flight hours and 40h of ground runs





# STRAIGHT TO THE FUTURE

Finmeccanica is a key player in Aerospace, Defence and Security.  
We bring innovation, global experience and proven technology.

Many skills, one single goal: building a safer future.

[finmeccanica.com](http://finmeccanica.com)

 **FINMECCANICA**





First flight of the SKYe SH09 came last October

# SWISS PRECISION

Marenco Swisshelicopter has no history or track record of rotorcraft design, but with its SKYe SH09 already flying, perhaps its fresh approach to the industry is proving a boon

**DOMINIC PERRY** PFÄFFIKON

**M**artin Stucki, the boss of start-up Marenco Swisshelicopter, is not like other chief executives, but then the manufacturer is also markedly different than most others in the sector.

Stucki – an engineer, commercial rotorcraft pilot and long-time helicopter enthusiast – arrives at our meeting in jeans, polo shirt and trainers, and sports a small earring in the lobe of one ear. There is nothing wrong with that, of course – and it is Friday when we meet in the company's Pfäffikon office, a converted cider factory – but his appearance does give a clue that things are done differently in this part of Switzerland.

Having been running a successful engineering consultancy since 2007 – Marenco Engineering – in 2009 he embarked on a mission to bring to market an all-new, high-performance, single-engined rotorcraft.

In other circumstances this might have been a great way to rapidly achieve bankruptcy, but thanks to the backing of an unnamed Russian investor – widely reported to be

banker Alexander Mamut – Marenco has moved relatively rapidly from drawing board to first flight of its SKYe SH09.

Sitting in the 2.5t (5,510lb) class, it faces competition from the three big Western manufacturers – AgustaWestland, Airbus Helicopters and Bell Helicopter – who all offer the latest iterations of well-established platforms in the weight category: the AW119Kx, H130 and 407GXP, respectively.

However, that has not stopped Marenco taking on the establishment to offer a product that competes with, but is not directly equivalent to, any of them.

## MARKET SPACE

"It is a relatively nice part of the market, especially for a Swiss-based company," says Stucki. What he means by this is not that the Swiss market is especially keen on light singles – although there is a clearly defined national market for high-powered Alpine utility helicopters – more that Swiss industry is adept at delivering "high precision in relatively low volumes", hence the nod to the watch-making industry with Marenco's tagline of "Swiss Movement".

**"If you look at a helicopter as an engineer, you see some details that you might improve"**

**MARTIN STUCKI**

Chief executive, Marenco Swisshelicopter

Stucki believes that through taking this approach Marenco can actually deliver what operators want, rather than perhaps what the industry thinks they need. "If you look at a helicopter as an engineer, then you see some details that you might improve," says Stucki. He makes no claims that his helicopter is revolutionary, but believes that some of its design features have led to a better overall product.

Take, for example, transporting a sling load. Conventionally, this has required a bubble cockpit window on the right-side of the aircraft and/or considerable contortion on the part of the pilot to peer out of that window to see the load's position.

Marenco's solution is simple: install a transparent panel between the two cockpit seats so the pilot can see straight down. And,



### SINGLE-ENGINE HELICOPTER SPECIFICATIONS

Type	MTOW	MTOW – external load	Empty weight	Engine take-off power
AgustaWestland AW119Kx	2,850kg	3,150kg	1,483kg	1,002shp
Airbus Helicopters H130	2,500kg	3,050kg	1,433kg	952shp
Bell Helicopter 407GXP	2,268kg*	2,722kg	1,221kg	813shp
Marengo SKYe SH09	2,650kg	2,800kg	N/A	1,020shp

NOTE: \*Optional MTOW of 2,381kg SOURCE: Manufacturers

conscious that not everyone will want to adapt to a new way of working, the cockpit floor now ends at the seat edge, which, coupled with a full-length window, allows a side view without needing to dislocate your neck.

There is another benefit: by removing the bubble window, the drag on both sides of the airframe is equalised, so there is no engine power wasted in countering it with the tail rotor. Another cockpit tweak is the easily adjusted foot pedals – release a simple aluminium catch to allow a number of different settings. The co-pilot's pedals and controls can be quickly removed, should the need arise, without having to then fit a protective cover.

The SH09 comes in a standard six-seat layout – two pilots and four passengers – featuring adjustable seating front and rear, with rails installed for an additional passenger seat. A high-density, eight-person configuration is also possible, with seven passengers and a single pilot.

### IN THE DESIGN

On the outside of the sleek, fully composite airframe there are further design tweaks to aid performance and capability. The low-profile tail boom is mounted high on the fuselage, allowing access to the rear clamshell doors without having to crouch – helpful when loading a stretcher for emergency medical missions. Further aft is a shrouded tail rotor – Marengo calls its design the Maestro – which, with a 120cm (47in) diameter, is larger than the 115cm version on the much heavier Airbus Helicopters H145. In addition, explains Stucki, the width of the shroud has been kept to a minimum, allowing an effect from the Maestro in forward flight akin to that of a pair of vertical fins; wind-tunnel tests allowed Marengo to ditch the small stabilisers seen on early designs of the SH09.

Power for the helicopter comes from Honeywell's HTS-900-2 turboshaft. Originally designed for the ill-fated Bell Arapaho for the US Army's cancelled armed reconnaissance helicopter requirement, the compact engine produces 1,020shp (760kW) at maximum take-off power. Availability, fuel economy and performance were all key criteria for its selection, says Stucki, noting that although its power output is not dissimilar from that of its rivals, it "has a little bit of an advantage" with "some future potential, it is not already maxed out".

It is worth noting, however, that the SH09 boasts more take-off power than all its most obvious rivals. Only the Pratt & Whitney Canada

PT6B on the AW119Kx comes close at 1,002shp, but that is fitted to a helicopter with a maximum take-off weight (MTOW) 200kg (441lb) heavier. That power is delivered via a five-blade composite main rotor, which at 11m (36ft) in diameter is larger than that of some rivals – with a lower tip speed, too. Stucki notes, with a certain satisfaction, that it is not vastly dissimilar, L-shaped blades aside, to the configuration recently unveiled on the Airbus Helicopters Bluecopter eco-demonstrator.

But the key to the SH09's hoped-for success, says Stucki, will be its versatility. Customers in the 2.5t class – and the Marengo tips the scales at 2,650kg MTOW – rarely have the security of much contracted work. Instead, operators "buy a helicopter and then look for work", and need to be willing to take on whatever comes their way.

First flight was achieved in October last year, with the initial phase of testing coming to a planned halt in the first half of 2015. A second prototype is due to fly late this year or early next, he says. This will incorporate modifica-



Cockpit features a number of innovations

tions to the bearingless rotor head and the layout of overhead switches in the cockpit. And a third flight-test article – planned to be closer to the eventual production standard – should follow in mid-2016, says Stucki.

### PRODUCTION PLANS

Structures for the second flight-test prototype are already being built by its various subcontractors, and are due for delivery to its assembly facility in the coming months. Its site at Mollis, which sits in the mountains some 45min from Pfäffikon, is a former Swiss air force base and now a sleepy aerodrome run by the local administration. So far, Marengo has a solitary building on the site, although once production ramps up, it could have as many as five.

To date, Marengo has taken in some 70 letters of intent for the helicopter – or around three years of production, with more still to be added. It plans to deliver 40 aircraft in the first two years, rising to a 100-per-year output within five. Certification is possible in late 2016 "if it all goes well", but is more likely in 2017, says Stucki, noting that it will have a clearer idea once prototype number two flies and "we go deeper into flight testing".

However, when the programme was launched back in 2012, service entry was envisaged this year. Possibly a sign of inexperienced Marengo biting off more than it could chew? Perhaps, admits Stucki, although he points out that it was not the development of the helicopter itself that slowed progress, but everything else around it.

"In some respects there were a thousand small items that we had to think about. We knew about the complexity of the helicopter – that's not a problem – but we also had to develop the flight-test instrumentation and infrastructure like the gearbox test bench and the whirl tower, as well as the supply chain.

"It was perhaps more than we estimated. I'm extremely unhappy about every day or week of delay, but if you look back at what we have achieved, it's not a bad track record," he says. ■

### PROFILE

## GROWING CONCERN IS INTERNATIONAL BY DESIGN

MARENCO SWISSHELICOPTER may bill itself as a Swiss affair, but aside from three facilities in the Alpine country, it has sites in Germany and South Africa. It shares its HQ and design office – located in a converted former cider factory that belonged to the Stucki family – with sister company Marengo Engineering.

By the end of the year, it will employ 100 people at the site

in Pfäffikon, near Zurich, but with its sister firm next door, it has additional engineering resources on tap.

Then there is the assembly line at Mollis airfield, plus an engineering test centre located in the town itself.

In addition, it has an office dedicated to certification compliance in Munich, staffed by 14 former Airbus Helicopters employees, with a total of 240

years of helicopter design experience between them. The link with Airbus does not end there, with Marengo having recently recruited Philippe Harache – one of the founding fathers of what was then Eurocopter – as its chairman.

Lastly, it has a relationship with a small engineering consultancy in South Africa, which has performed windtunnel tests and other evaluations. ■

# LONDON CALLING



The current MD902 is dispatched at least five times per day anywhere inside the capital

After more than two decades of operating with one aircraft, London's Air Ambulance charity is poised to acquire a second helicopter – and expand its life-saving services

**CRAIG HOYLE** LONDON

**T**he view is commanding, despite the heavy rain which lashes the helipad on a cold September morning. Some 280ft above the entrance to the Royal London Hospital in Whitechapel, this is the perfect launch point for an aircraft which is tasked with saving lives among the capital's more than 10 million residents, commuters and workers.

Sporting a striking red livery not unlike that used on the thousands of buses which connect up the city, the MD Helicopters MD902 operated by London's Air Ambulance is a familiar sight in the sky above the metropolis, having been in service with the charity for the last 15 years. Adapted for the emergency medical services role, G-EHMS is flown with a crew of two pilots as well as a three-strong advanced trauma team made up of a doctor, paramedic and training paramedic.

Their mission is not necessarily to airlift an injured person to hospital, but to stabilise the

casualty on arrival at the accident scene – if necessary making interventions up to performing a blood transfusion, or even open-heart surgery, on the roadside.

If an air transfer is still required after such immediate work, the 2.9t aircraft will move the patient to one of London's four main trauma hospitals, or to another specialist unit.

Once dispatching the air ambulance has been deemed appropriate by a paramedic located in an NHS control room and by the team at the Royal London, a klaxon sounds in the compact crew room located on the 17th floor of the hospital. The pilots will be on board and ready to lift within 3-4min, with the medical team boarding as the MD902 is started up. Within 15min, the aircraft – which can achieve

140kt (260km/h) – can touch down at any area inside London's M25 orbital motorway.

## GROUND SAFETY

Typical incidents include responding to road traffic accidents, people involved in falls from height and those struck by trains, as well as stabbings and shootings. Landing locations must have free space of at least double the MD902's rotor diameter of just over 10m (33ft), with one pilot flying and the other with 'eyes outside' the cockpit to look for potential hazards. This small footprint rules out the use of a larger aircraft, while the type's no tail-rotor design also increases safety on the ground.

"At worst, someone only gets blown over," notes Andy Thomson, one of five captains who fly the aircraft under a 12h shift pattern covering daylight-only operations. "For our role in London it's great, with good visibility for the pilots." Nighttime operations are not possible in an urban environment, and during those hours rapid response vehicles are used instead.

For the first time in its 26-year history, the

**"No day is the same, and the weather and the time of day doesn't really come into it"**

**ANDY THOMSON**  
Captain, London's Air Ambulance



### "This is the most sought-after posting, because you get the most experience"

**JOHN POWER**

Chief fire officer, London's Air Ambulance

charity operated under extended flying hours between April and early September, with the change made possible by contracting three highly experienced co-pilots to help crew two shifts per day.

"No day is the same, and the weather and the time of day doesn't really come into it," Thomson says. "Most of our flights are 5min – but there is a lot going on," he notes. The team might remain on the ground for 1h in order to stabilise a casualty, with between five and 11 missions typically flown per day.

London's Air Ambulance requires support totalling £4 million (\$6.2 million) per year to sustain its operations, with a further £1 million allocated by the NHS. While it has in the past had the backing of major sponsors – first the *Daily Express* newspaper, and then Virgin – it now relies on more limited corporate funding from a handful of companies, plus donations from the public.

After a lengthy fund-raising campaign, the charity is on track to acquire a second aircraft, with an announcement expected following national air ambulance week in the UK – which runs from 21-27 September. It has so far raised more than £4 million of a £6 million target to acquire and support the additional helicopter



Two pilots accompany a doctor, paramedic and training paramedic in a five-strong crew

and "extend the charity's daylight flying hours for five years".

#### IMPROVED SERVICE

By having two aircraft available, the charity should be able to sustain a more uninterrupted service, as G-EHMS has been unavailable for the equivalent of 53 days so far this year, due to essential maintenance. Such work is performed at its overnight and support location: the Royal Air Force's Northolt base in West London. The charity estimates that it will be able to treat 400 extra patients per year with a

two-strong fleet. While the operator declines to provide details ahead of an announcement, *Flight International* understands that it intends to obtain a second MD902, to ensure crew commonality and maintain its pilots' ability to land in small spaces.

London's Air Ambulance has treated almost 33,500 patients since its launch in 1989; initially equipped with a Eurocopter AS365 Dauphin. In 2014, its staff treated just over 1,800 patients at locations around the capital.

The team has made numerous sector-leading advances, such as being the first UK air ambulance to operate with two pilots and to carry refrigerated blood supplies on board.

Last year, it also began to use a technology which can prevent casualties such as cyclists who have been crushed by heavy goods vehicles from bleeding to death, by inserting and inflating an endovascular balloon to temporarily stop the supply to damaged blood vessels.

Other techniques – such as how to deal with severed limbs – have been improved thanks to the direct experience of personnel who served in medical emergency response teams during the UK's combat involvement in Afghanistan.

Senior doctors assigned by Barts Health NHS Trust will spend six months with the air ambulance and paramedics seconded from the London Ambulance Service nine months. During this time, they will gain daily exposure to major trauma, while pilots get to fly in one of the most dynamic environments possible.

"This is the most sought-after posting, because you get the most experience," notes John Power, the charity's chief fire officer, who has spent more than 20 years with the operation. ■



Landing spaces must be at least twice the size of the aircraft's 10m rotor diameter



To support London's Air Ambulance, visit [yourhelicopter.london](http://yourhelicopter.london), and for information about the UK's other such charities, go to [associationofairambulances.co.uk](http://associationofairambulances.co.uk)

# SAFETY FIRST

Almost a decade on from the launch of the International Helicopter Safety Team, positive results are being seen, with accident numbers beginning to show a decrease

DAVID LEARMOUNT LONDON

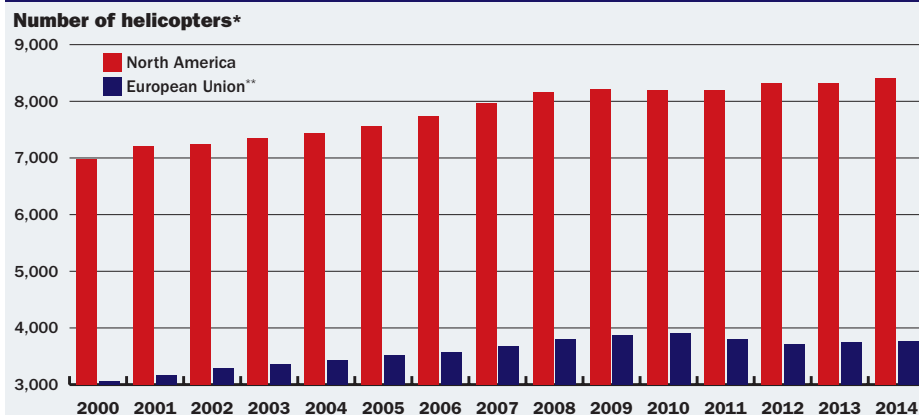
**H**elicopter safety, in a state of stagnation for decades until recently, finally appears to be responding to treatment, says the International Helicopter Safety Team (IHST).

The IHST was launched at a meeting in Montreal in 2006, to see if it could do something about the fact that helicopter accidents were not reducing while the airline sector was witnessing huge safety improvements. In the 1990s, the US airline sector had set up the Commercial Aviation Safety Team (CAST) to extract data from years of accident and incident reports, identify problems and prioritise solutions. It worked, and not just in the USA, because regional safety teams in the mould of CAST were gradually set up all over the world.

Today, reflecting the work of the IHST and its regional offshoots, beneficial results are showing in the rotary wing sector. The improvement was faltering at first and has seen setbacks, but now seems to be gathering pace.

Last year, US civil-helicopter accident numbers reduced to the lowest level since the early 1980s, according to the IHST, and that improvement appears to be continuing strongly into 2015. During 2014, the US rotary-wing industry experienced 3.64 accidents per 100,000 flight hours; a 26% reduction com-

## HELICOPTERS IN SERVICE



SOURCE: Flightglobal Ascend. \*all helicopter types, civil or government service (not military); \*\*current EU 28

pared with 2013 and a 54% reduction compared with the 2001-2005 'baseline accident rate'. This 'baseline' rate was the industry accident rate measured in the five years before the IHST began its work. According to the IHST, before 2006 the number of worldwide civil-helicopter accidents was rising at a rate of 2.5% per year, but since 2006 the number of accidents worldwide has been decreasing by an annual rate of 2%.

The US rotary-wing fatal accident rate also reduced. During 2014, there were 0.59 fatal helicopter accidents per 100,000 flight hours

compared with 1.02 fatal accidents per 100,000 flight hours in 2013 – a 42% decrease year-on-year, and a 55% reduction compared with the 2001-2005 baseline fatal accident rate of 1.31. The IHST attributes this to United States Helicopter Safety Team (USHST) safety education and communication efforts, where safety solutions derived from years of helicopter accident and incident data analysis were successfully shared with operators.

According to preliminary USHST data, the dip in the accident rate during 2014 came after two consecutive years of increases, giving rise to nervousness about the resilience of the long-term improvement. But the 2014 rate was the lowest in the past 15 years of collected data. In addition, the team notes, the fatal accident rate has been below 0.70 per 100,000 flight hours in four out of the past six years.

Meanwhile, the IHST has noted that US civil helicopter safety is continuing to improve rapidly this year. Figures for January-June 2015 show that 46 civil helicopter accidents occurred in the USA, compared with 64 total accidents during the same months of 2014. During the first half of 2015, there were 10 fatal helicopter accidents. This compares with nine during the same period in 2014 and 17 in the first half of 2013.

When the IHST began, the target was to reduce helicopter accident rates by 80% by 2016. Barring a miracle that will not be achieved but, in the USA at least, it looks as if an improvement of 50% may well be consolidated, and that is a remarkable change for the



**Wreckage of the Bond Air Services H135 which crashed in Glasgow in 2013**



better. But the US improvement in fatal, rather than overall, accident statistics has been, it says, “less consistent”, showing a “good-year, bad-year” pattern, even if there has been a slow downward trend in the long term. The USHST’s reaction has been – since fatal accidents are only reducing slowly – to search for ways of improving passenger and crew survivability, by researching and implementing improvements in cockpit, cabin and seat design.

Meanwhile, the European Aviation Safety Agency works with the IHST’s regional counterpart, European Helicopter Safety Team (EHST) and its data analysis team European Helicopter Safety Analysis Team (EHSAT). Its accident figures are not so easy to interpret because gathering data from nearly 30 states – not all of which conduct detailed analytical investigations of light helicopter accidents – and amalgamating it accurately is not so simple. There is a visible improvement in certain sectors of the European rotary-wing industry, but not as much as in the USA. Arguably, however, there was more room for improvement in the USA – and more low-hanging fruit.

## DATA-DRIVEN

About three years ago, EHSAT published its first analysis based on the examination of accidents that occurred during a 2000-2006 baseline period before the IHST’s global exercise in improving helicopter safety began. This year, the EHSAT published its second analysis of accidents, this time during the post-IHST period of 2006-2010, looking for developments or simple comparisons with the baseline period. The study said that “the issues identified in the [2000-2005] period continue to be of concern, and that the safety improvement actions decided and developed based on the first analysis period [are] therefore still valid”.

Meanwhile, the European figures for rotary-wing accident numbers show a decline from 2008 onwards in accidents involving commer-



The aftermath of an attempted forced landing near Bad Segeberg, Germany, in April 2009

cial air transport (CAT) helicopters, but no significant change in accidents involving general aviation and airwork rotary-wing operations.

EHSAT’s work, much like that of other IHST regional studies, was purely data driven, and the data was analysed using strictly defined criteria agreed at the IHST. The analysis goes far beyond counting the numbers of accidents and identifying the accident rates: it delves deep into the technical, operational

and human factors behind each accident, then presents these standard problem statements (SPS) in order of their significance as contributory factors.

One of the significant discoveries, in the USA, Europe and elsewhere since these regional analyses have been done is that, with very minor variations, the causes and contributory factors leading to helicopter accidents were much the same, wherever in the world they occurred.

For example, the top SPS factor identified in more accidents than any other is “pilot judgement and actions”, which is present as a primary factor in nearly 70% of all accidents. This was the same in the analysis of both 2000-2005 and 2006-2010, and shows up in a similarly dominant way on both sides of the Atlantic. Failures in safety management, ground duties (including flight preparation) and pilot situational awareness are also high on the primary SPS list, with “parts or system failure” further down.

Announcing a new downloadable leaflet on threat and error management (TEM) for pilots earlier this year, EHST had this to say: “Data analysis confirms that a continuing significant number of helicopter accidents occur due to poor decision making and human performance made both prior and during flight. The aim of this new... leaflet is to introduce and illustrate the concept of TEM to flight crews and training organisations.”

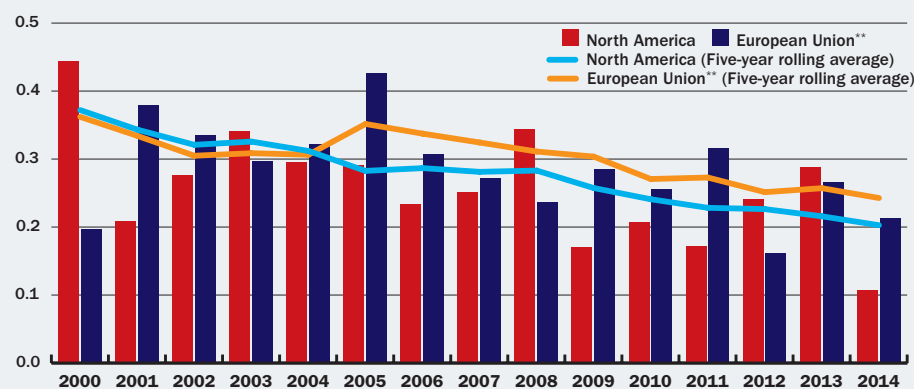
Unlike the experience in fixed-wing aviation, most European helicopter accidents across all industry sectors occur in the en-route phase (27% of rotary wing accidents). The next most risky flight phase is “manoeuvring flight” (23%), so those two would account for half of all accidents. The manoeuvring phase involves “intentional low-level,



Emergency procedures have improved

## FATAL ACCIDENTS PER 100 HELICOPTERS IN SERVICE\*

Number of fatal accidents



SOURCE: Flightglobal Ascend. \*all types; \*\*current EU 28

» low-speed flying in the vicinity of obstacles” – but not the approach and landing or the take-off and departure phases, which is the phase where most of the aerial-work accidents occurred (39%).

Also noteworthy, says the report, is that 61% of all fatal rotary-wing accidents occurred in the en-route phase, while most accidents causing serious injuries occurred in the manoeuvring phase (25%).

The EHSAT 2006-2010 analysis found the CAT helicopter sector often suffered poor management of operations and the assignment of inexperienced pilots to difficult missions. In accidents where ground preparation was a factor, poor mission planning dominated. Among those in which pilot situational awareness was an issue, lack of alertness regarding the external environment, weather and visibility stand out.

Since the 2000-2005 analysis report was published, the European Helicopter Safety Implementation Team (EHSIT), including specialist teams in Training, Ops & SMS and Technology, have produced a number of safety-promotion deliverables in the form of leaflets, videos, toolkits, manuals and reports. That material addresses, and provides ways to mitigate, the top safety issues and intervention recommendations identified.

Now the results of the analysis of the 2006-2010 accidents will contribute to shaping future priorities and further actions of the EHSIT specialist teams, but since studies of the two periods largely validated each other's findings, this will probably be more about refining recommendations than making radically new ones. EASA says results will also be shared within the agency and contribute to defining the helicopter Safety Risk Portfolio, which will serve as a basis to develop the helicopter section of the European Aviation Safety plan.

### BACK TO SCHOOL

The IHST states its strategy for today includes these elements: operator safety management systems; training; systems and equipment – including flight-data monitoring and health and usage monitoring systems; and maintenance. If that looks like a “back to school” summary of what's needed, so be it. Maybe back to school is what's required.

The products aimed at refreshing operators' knowledge and awareness include IHST or regionally-produced fact sheets, safety toolkits, safety bulletins, safety leaflets and videos, manuals and guides.

The EHEST products certainly have a back-to-school flavour, consisting of handbooks entitled: Safety Considerations; Helicopter Airmanship; Off-Airfield Landing Site Operations; and Decision-Making. On more advanced themes, EHEST offers Threat And Error Management for Helicopter Pilots, In-



Human error is believed to have caused an East River fatality in New York in 2011

structors and Training Organisations and Helicopter Automation Management. It offers a video on Degraded Visual Environment and Loss Of Control and Passenger Management. Just published is a comprehensive Helicopter Flight Instructor Manual.

This barrage of information for helicopter operators and pilots is so comprehensive it looks like an indictment of existing training, both ab initio and recurrent. But it has been compiled as a result of analysing hard accident and incident data and identifying training and operational needs, so it does not merely look like an indictment – it actually is one.

EHSAT's analysis of SPS indicators demonstrated that human factors are consistently top of the causal list for helicopter accidents, in the form of “pilot judgement and actions”, and other regions have found the same. In the airline safety world, advanced technology is recognised as being the single largest component in air-safety performance improvement over the last 30 years or more.

So EHEST commissioned the Dutch research organisation NLR to carry out a study of what technology could do to enhance helicopter safety. Entitled *The Potential of Technologies to Mitigate Helicopter Accident Factors*, the first sentence in the introduction makes a clear case for the study: “Technology is not high on the list of accident/incident factors, as it is merely the lack of technology that may have led to an accident.”

On an allied subject, EHEST has also published a safety promotion leaflet entitled *Advantages of Simulators in Helicopter Flight*

*Training* – an under-used resource in most of the helicopter industry. The technology study looked at several different areas: emerging technologies; existing technologies not yet used on helicopters; and existing technologies used on large helicopters, but not yet on small ones.

### Unlike in fixed-wing aviation, most European helicopter accidents across all sectors occur in the en-route phase

Among these, 145 technologies were “identified”, 93 have been “rated”, 50 declared “moderately promising” and 15 declared “highly promising”. Among the latter, five technologies have been identified as highly effective for mitigating three or more safety issues. These include: a terrain awareness and warning system; a laser radar obstacle and terrain avoidance system; digital-range image algorithms for flight guidance aids for helicopters in low-level flight; digital maps; and, finally, a voice and flight data recorder.

Again, the plethora of advice EHEST and the USHST have seen fit to prepare for the industry makes the task look like a back to the drawing board exercise. Maybe the lack of a fundamental review of the industry's way of operating has been the problem all along, and will remain a problem until operators and trainers start taking some of the IHST's data-driven advice on board. ■



From yuckspeak to tales of yore, send your offcuts to [murdo.morrison@flightglobal.com](mailto:murdo.morrison@flightglobal.com)

## Plea to keep the last Vulcan flying

Inevitably – as its last air show season draws to a close – a petition is circulating to keep the sole airworthy Avro Vulcan, XH558, flying.

The Vulcan to the Sky trust, which got the V-bomber airborne again after a 14-year hiatus, admits the iconic aircraft has far exceeded the 250 flying hours promised when it returned to flight eight years ago. Not only that, but the three companies providing technical support – BAE Systems, Marshall Aerospace and Rolls-Royce – are no longer prepared to guarantee its airworthiness.

Ian Hopkinson is behind the petition to urge the three companies to “release vital information and documents, and establish working agreements to enable other willing parties to take over” the bomber’s upkeep.

He believes there “are companies that have the required skills who would be happy to support the Vulcan. However, they would need access to information only available from the original manufacturer.”

At the time of writing, the petition was only a few thousand signatures short of its 25,000 target. We wish the “Vulcanatics” well, of course, but we suspect that there might be a greater chance of resurrecting Concorde.



## Climb on board

Has Airbus come up with a cunning inside job to wrest Ryanair from Seattle’s clutches? An item on the all-737 low-cost carrier’s annual general meeting on 24 September read thus: “To elect the following additional director who... being eligible, offers [himself] for election: John Leahy...”

Further reading of the document reveals that said Mr Leahy is, sadly, not Airbus’s sales supremo but a former British Airways Boeing 747 chief pilot.

## 757 replacement

File this under “close but no cigar”: United Arab Emirates leasing company Aerovista’s



## Boeing for a song

brochure advertising its new Tupolev Tu-204 which, while it bears a strong similarity to the Boeing 757, isn’t quite similar enough to get away with using a 757 photo.

## DJs take a spin

Air Charter Service is reporting a “record number of charters for big name DJs... to manage their busy festival and club schedules over the summer months”. DJs in private jets? It wasn’t like that in Smashy and Nicey’s day.

## Papal bull

Intiguing tweet of the week from the FAA: “Coming to see the Pope? Remember DC is a #NoDroneZone”. Apparently flying even a remote-controlled model aircraft during a Papal visit is subject to prosecution.

## The invisible man

A certain aviator, [Anton] Knubel, was making trials with a so-called invisible machine near Münster. A few days ago he again ascended in his latest monoplane in the presence of a great number of people. He climbed to a height of about 300 or 400 metres, when suddenly his machine made a dive and crashed to earth, the pilot being killed instantly.

## Bombers beaten

Last Friday, September 27, saw another great attempt to overwhelm Britain by daylight. Raids were coming over at intervals all day, and attention was divided between London and Bristol. Very few bombers got through to their objectives, and when they appeared there were always fighters on their track.

## New clubhouse

The Yorkshire Aeroplane Club has just opened a new £15,000 clubhouse at Leeds and Bradford Airport.

The new premises house the pilot training section of Yorkshire Flying Services Ltd, and stand in the southern corner of the airfield.

## Bangalore delay

Indian Airlines will take delivery of the remaining four

Airbus A320s originally scheduled to be received by last

March. The airline had asked Airbus Industrie to postpone in the wake of the Bangalore incident.

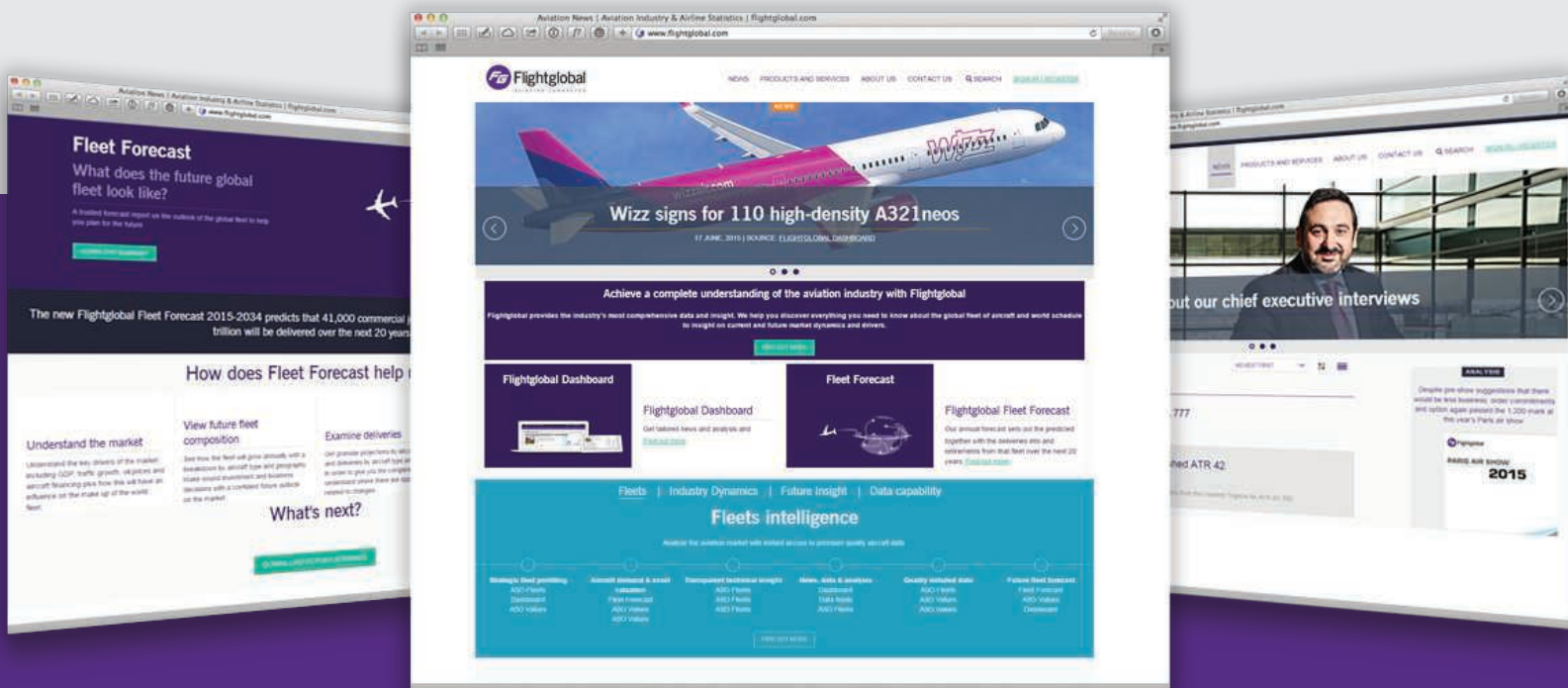
**100-YEAR ARCHIVE**  
Every issue of *Flight* from 1909 onwards can be viewed online at [flightglobal.com/archive](http://flightglobal.com/archive)



“Think Fab FM’ll fly us to the roadshow at Clacton-on-Sea, mate?”

# Times are changing... So is Flightglobal.com

We have given our website a complete make-over bringing you an even better experience. Use our simpler navigation to find the news and insights you need. Plus, explore in depth how our products and services can help you.



Check it out at  
[www.flightglobal.com](http://www.flightglobal.com)



# EDITORIAL, ADVERTISING, PRODUCTION & READER CONTACTS

## EDITORIAL +44 20 8652 3842

**Quadrant House, The Quadrant,  
Sutton, Surrey, SM2 5AS, UK**  
flight.international@flightglobal.com

**Editor** Craig Hoyle  
+44 20 8652 3834 craig.hoyle@flightglobal.com  
**Deputy Editor** Dominic Perry  
+44 20 8652 3206 dominic.perry@flightglobal.com  
**Head of Strategic Content** Murdo Morrison FRAeS  
+44 20 8652 4395 murdo.morrison@flightglobal.com  
**Features Editor** Dan Thisdell  
+44 20 8652 4491 dan.thisdell@flightglobal.com  
**Business & General Aviation Editor** Kate Sarsfield  
+44 20 8652 3885 kate.sarsfield@flightglobal.com  
**Aerospace and Defence Reporter** Beth Stevenson  
+44 20 8652 4382 beth.stevenson@flightglobal.com  
**Consulting Editor** David Learmount  
+44 7785 901787 david.learmount@btworld.com  
**Magazine Enquiries** Dawn Hartwell  
+44 20 8652 3315 dawn.hartwell@flightglobal.com

## AIR TRANSPORT TEAM

**Editor Flightglobal Premium News** Graham Dunn  
+44 20 8652 4995 graham.dunn@flightglobal.com  
**Managing Editor** Niall O'Keefe  
+44 20 8652 4007 niall.o'keefe@flightglobal.com  
**Air Transport Editor** David Kaminski-Morrow  
+44 20 8652 3909 david.kaminski-morrow@flightglobal.com  
**Air Transport/MRO Reporter** Michael Gubisch  
+44 20 8652 8747 michael.gubisch@flightglobal.com  
**Senior Reporter** Oliver Clark  
+44 20 8652 8534 oliver.clark@flightglobal.com

## AMERICAS

**Americas Managing Editor** Stephen Trimble  
+1 703 836 8052 stephen.trimble@flightglobal.com  
**Deputy Americas Editor - Air Transport** Ghim-Lay Yeo  
+1 703 836 9474 ghimlay.yeo@flightglobal.com  
**Air Transport Reporter** Edward Russell  
+1 703 836 1897 edward.russell@flightglobal.com  
**Air Transport Reporter** Jon Hemmerdinger  
+1 703 836 3084 jon.hemmerdinger@flightglobal.com  
**Aviation Reporter** James Drew  
+1 703 836 7442 james.drew@flightglobal.com

## ASIA/PACIFIC

**Asia Editor** Greg Waldron  
+65 6780 4314 greg.waldron@flightglobal.com  
**Asia Air Transport Editor** Mavis Toh  
+65 6780 4309 mavis.toh@flightglobal.com  
**Asia Finance Editor** Ellis Taylor  
+65 6780 4307 ellis.taylor@flightglobal.com  
**Reporter** Aaron Chong  
+65 6780 4851 aaron.chong@flightglobal.com

## EUROPE/MIDDLE EAST

**Israel Correspondent** Arie Egozi

## FLIGHTGLOBAL.COM

**Editor** Stuart Clarke  
+44 20 8652 3835 stuart.clarke@flightglobal.com  
**Web co-ordinator** Rebecca Springate  
+44 20 8652 4641 rebecca.springate@flightglobal.com

## EDITORIAL PRODUCTION

**Head of Design & Production** Alexis Rendell  
**Global Chief Copy Editor** Lewis Harper  
**Chief Copy Editor, Europe** Dan Bloch  
**Layout Copy Editors** Max Hall, Sophia Huang, Tim Norman  
**Global Production Editor** Louise Murrell  
**Deputy Global Production Editor** Terence Burke  
**Deputy Digital Producer** Damion Diplock  
**Web Production Editor** Andrew Costerton  
**Senior Designer** Lauren Mills  
**Consulting Technical Artist** Tim Hall

## DISPLAY ADVERTISEMENT SALES

**Quadrant House, The Quadrant,  
Sutton, Surrey, SM2 5AS, UK**

## EUROPE

**Global Sales Manager** Mark Hillier  
+44 20 8652 8022 mark.hillier@flightglobal.com  
**Key Account Manager** Grace Hewitt  
+44 20 8652 3469 grace.hewitt@flightglobal.com  
**Sales Support** Gillian Cumming  
+44 20 8652 8837 gillian.cumming@rbi.co.uk

## NORTH & SOUTH AMERICA

**Vice-President, North & South America**  
Rob Hancock +1 703 836 7444  
robert.hancock@flightglobal.com  
**Regional Sales Director**  
Warren McEwan +1 703 836 3719  
warren.mcewan@flightglobal.com  
**Sales Executive** Kaye Woody  
+1 703 836 7445 kaye.woody@flightglobal.com  
Reed Business Information, 333 N. Fairfax Street,  
Suite 301, Alexandria, VA 22314, USA

## ITALY

**Sales Manager** Riccardo Laureri  
+39 (02) 236 2500 media@laurerassociates.it  
Laureri Associates SRL, Via Vallazze 43,  
20131 Milano, Italy

## ISRAEL

**Sales Executive** Asa Talbar +972 77 562 1900  
Fax: +972 77 562 1903 talbar@talbar.co.il  
Talbar Media, 41 HaGiva'a St, PO Box 3184, Givat  
Ada 37808, Israel

## ASIA/AUSTRALASIA

**Key Account Manager** Jay Ee  
+65 6780 4301 jay.ee@flightglobal.com  
Fax: +65 6789 7575  
1 Changi Business Park Crescent,  
#06-01 Plaza 8 @ CBP, Singapore 486025

## RUSSIA & CIS

**Director** Arkady Komarov  
komarov@worldbusinessmedia.ru  
Tel/Fax: +7 (495) 987 3800  
World Business Media, Leningradsky Prospekt, 80,  
Korus G, Office 807, Moscow 125190, Russia

## CLASSIFIED & RECRUITMENT

**Sales Manager** Sophie Wild  
sophie.wild@rbi.co.uk  
**Recruitment & Classified Key Account**  
**Executive** Katie Mann  
+44 20 8652 4900  
Recruitment.services@rbi.co.uk  
**Recruitment & Classified Sales Executive**  
Stuart Lee +44 20 8652 4900  
Classified.services@rbi.co.uk  
**Key Account Manager - Asia** Jay Ee  
+65 6780 4301

## ADVERTISEMENT PRODUCTION

**Production Manager** Sean Behan  
+44 20 8652 8232 sean.behan@rbi.co.uk  
**Production Manager Classified** Alan Blagrove  
+44 20 8652 4406 alan.blagrove@rbi.co.uk

## MARKETING

**Marketing Director** Justine Gillen  
+44 20 8652 8031 justine.gillen@flightglobal.com

## DATA TEAM

**Head of Data** Pete Webber  
+44 20 8564 6715  
peter.webber@flightglobal.com  
**Commercial Aviation** Steven Phipps  
+44 20 8564 6797  
steven.phipps@flightglobal.com  
**Fleet Research Manager** John Maloney  
+44 20 8564 6704  
john.maloney@flightglobal.com

## PUBLISHING MANAGEMENT

**Chief Operating Officer**  
Philippa Edward  
**Executive Director Content**  
Max Kingsley-Jones  
max.kingsley-jones@flightglobal.com  
**Publisher** Stuart Burgess  
stuart.burgess@flightglobal.com

## READER SERVICES

### Subscriptions

Jenny Smith  
Flight International  
Subscriptions, Reed Business Information,  
PO Box 302, Haywards Heath,  
West Sussex, RH16 3DH, UK



### Subscription Enquiries

From UK: 0330 333 9533  
From overseas: +44 1444 475 682  
Fax +44 1444 445301  
flightinternational.subs@quadrantsubs.com

### Subscription Rates

1 Year: £141/\$225/€174  
2 Years: £239.70/\$382.50/€295.80  
3 Years: £338.40/\$540/€417.60  
Only paid subscriptions available. Cheques  
payable to Flight International

Flight International welcomes unsolicited contributions  
from readers but cannot guarantee to return  
photographs safely.

© and Database Rights 2015 Reed Business Information  
Ltd. All rights reserved. No part of this publication may be  
reproduced, stored in a retrieval system or transmitted in  
any form or by any means, electronic, mechanical,  
photocopying, recording or otherwise, without the prior  
permission in writing of the publishers.



Ascend, a Flightglobal  
advisory service, is a leading  
provider of expert advisory  
and valuations services to

the global aviation industry. Its specialist, independent  
services inform and shape the strategies of aviation  
businesses worldwide. Ascend offers an unrivalled  
breadth and depth of aviation expertise and experience,  
backed by unique access to robust industry data.  
**www.ascendworldwide.com Tel: +44 20 8564 6700**  
**email: consultancy@ascendworldwide.com**



Flightglobal's dashboard is a paid-for news and data  
service for professionals who need to find new  
opportunities or track competition within the air transport  
industry. The service puts a wealth of global intelligence at  
your fingertips, covering everything from airline fleets,  
routes and traffic, through to aircraft finance, industry  
regulation and more. **www.flightglobal.com/dashboard**



Flightglobal Insight provides a range of tailored research  
reports and analysis, with access to information and  
industry expertise from the unrivalled Flightglobal Premium  
services portfolio. **www.flightglobal.com/insight**  
**Tel: +44 20 8652 3914 email: insight@flightglobal.com**

Registered at the Post Office as a newspaper.  
Published by Reed Business Information Ltd, Quadrant  
House, The Quadrant, Sutton, Surrey SM2 5AS, UK.  
Tel: +44 20 8652 3500.

Newstrade distributed by Marketforce (UK), 2nd Floor,  
5 Churchill Place, Canary Wharf, London, E14 5HU, UK.  
Tel: +44 20 3787 9001.

Classified advertising prepress by CCM.  
Printed in Great Britain by William Gibbons and Sons Ltd.

Flight International published weekly 49 issues per year.  
Periodicals postage paid at Rahway, NJ. Postmaster send  
changes to Reed Business Information, c/o Mercury  
International Ltd, 365 Blair Road, Avenel, NJ 07001

This periodical is sold subject to the following conditions:  
namely that it is not, without the written consent of the  
publishers first given, lent, re-sold, hired out or in any  
unauthorised cover by way of trade, or affixed to, or as  
part of, any publication of advertising, literary or pictorial  
matter whatsoever. No part of the content may be stored  
electronically, or reproduced or transmitted in any form  
without the written permission of the Publisher.

ISSN 0015-3710 (Print) ISSN 2059-3864 (Online)

Part of rbi reed business  
information



# EVENTS

## 14-15 October

**Aerospace Innovation Forum**  
Palais des Congrès, Bordeaux, France  
aerospace-innovation-forum.com

## 20-21 October

**The Commercial UAV Show**  
ExCel, London, UK  
terrapiinn.com/exhibition/  
the-commercial-uav-show

## 8-12 November

**Dubai Air Show**  
Dubai World Central  
dubaiairshow.aero

## 12 November

**Ascend West Coast: Finance**  
San Francisco, USA  
flightglobalevents.com/  
ascendwestcoast15

## 15-17 November

**ALTA Airline Leaders Forum**  
San Juan, Puerto Rico  
alta.aero/airlineleaders/2015

## 17-19 November

**NBAA 2015**  
Las Vegas, USA  
nbaa.org/events/bace/2015

## 17-19 November

**Aerospace & Defense Meetings Torino**  
bciaerospace.com/turin

## 19-20 November

**Safety In African Aviation**  
Kigali, Rwanda  
2gether4safety.org

## 1-2 December

**Military Airlift & Rapid Reaction Ops**  
Seville, Spain  
smi-online.co.uk/defence/europe

## 8-10 December

**Aerospace Meetings Brazil**  
bciaerospace.com/brazil

## 3-4 February 2016

**Aircraft Interiors Middle East**  
Dubai World Trade Centre, UAE  
aime.aero/welcome-to-aime-2016

## 16-21 February 2016

**Singapore Air Show**  
Changi Exhibition Centre, Singapore  
singaporeairshow.com

## 17-19 February 2016

**Routes Americas**  
Puerto Rico  
routesonline.com/events/178/  
routes-americas-2016

## 6-8 March 2016

**Routes Asia**  
Manila, Philippines  
routesonline.com/events/180/  
routes-asia-2016

## 26 March - 3 April 2016

**FIDAE**  
Santiago, Chile  
fidae.cl/en

## 5-7 April 2016

**Aircraft Interiors**  
Hamburg, Germany  
aircraftinteriorsexpo.com

## 18-21 April 2016

**Defence Services Asia**  
Putra World Trade Centre, Kuala Lumpur  
dsaexhibition.com



For a full list of events see  
**flightglobal.com/events**

# CLASSIFIED

**TEL** +44 (0) 20 8652 4897 **FAX** +44 (0) 20 8652 3779 **EMAIL** [classified.services@rbi.co.uk](mailto:classified.services@rbi.co.uk)

Calls may be monitored for training purposes

## New and used aircraft




**Gulfstream®**  
Independent Authorised Sales Representative for the United Kingdom

**Tim Leacock**  
AIRCRAFT SALES LIMITED

+44 (0) 1258 818181 [tim@timleacockaircraft.com](mailto:tim@timleacockaircraft.com) [jonathan@timleacockaircraft.com](mailto:jonathan@timleacockaircraft.com) [timleacockaircraft.com](http://timleacockaircraft.com)

## Courses and tuition



**CAAi**  
Above and beyond

### SMS Courses from the UK CAA Experts

London Gatwick | Dubai

Developed by UK CAA Regulators and based on EASA and ICAO Standards and Recommended Practices, our comprehensive portfolio of SMS courses are designed to support aviation professionals at all levels.

- **Basic Introduction to SMS**  
Gatwick 12-14 Jan 2016 | Dubai 8-10 Nov 2015
- **SMS Overview for Managers**  
Gatwick 3 Nov 2015, 15 March 2016 | Dubai 7 Feb 2016
- **Advanced SMS – Evaluating Effectiveness**  
Gatwick 14-15 Oct 2015, 9-10 Feb 2016 | Dubai 11-12 Nov 2015
- **Risk Monitoring & Safety Performance**  
Gatwick 26-27 Jan 2016

To book now or for more information, please visit [www.caainternational.com/training](http://www.caainternational.com/training) or contact us  
T +44 (0) 1293 768700 or  
E [training@caainternational.com](mailto:training@caainternational.com)

A wholly owned subsidiary of the UK CAA



## Business services



**AOG**

**URGENT**

Dauphin parts in stock

**alpine**.aero  
air support

## FLIGHT INTERNATIONAL

To advertise in this classified section:

**call** +44 (0) 20 8652 4897

**fax** +44 (0) 20 8652 3779

**email** [classified.services@rbi.co.uk](mailto:classified.services@rbi.co.uk)

Please note that calls may be monitored for training purposes

## Equipment, maintenance and service



**mt-propeller**

*Beech King Air 90 Series*

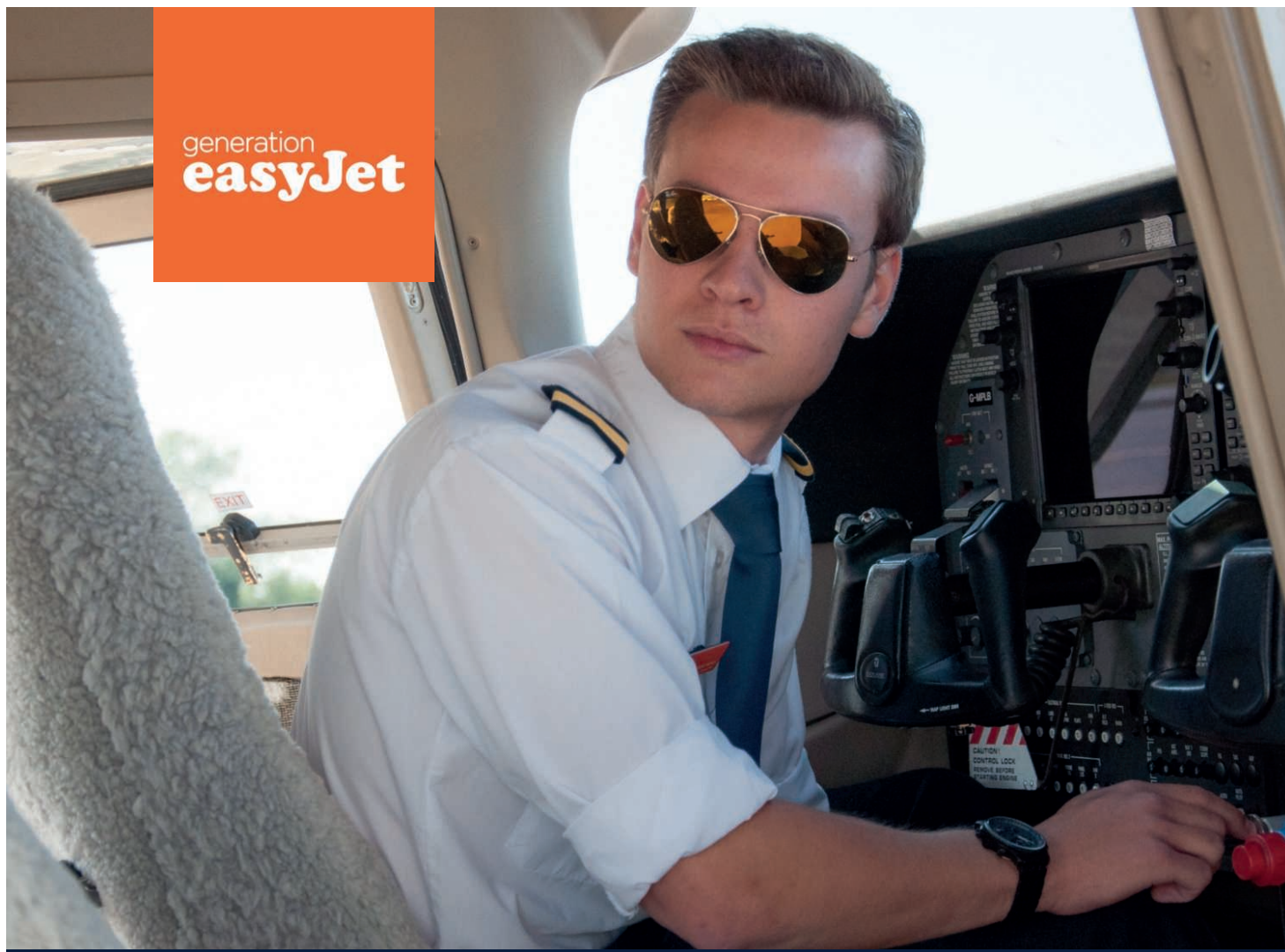
Airport Straubing-Wallmühle, EDMS  
94348 Atting / Germany  
phone: +49-(0)9429-9409-0, fax: +49 (0)9429-8432  
sales@mt-propeller.com  
**www.mt-propeller.com**

**Development & Production**  
of high performance composite constant speed propellers and fixed pitch propellers.

**Sales & Service** for products made by McCauley, Hartzell, Sensenich, Woodward, Goodrich.







## See the world in orange?

CAE Oxford Aviation Academy is looking for enthusiastic people with a genuine passion for flying to apply now for the easyJet mentored pilot training programme. If you have energy, determination and the ultimate goal of joining the fourth largest airline in Europe, then we want to hear from you.

Courses start from April 2016.

**Discover more:** [www.caeoaa.com/easyJet](http://www.caeoaa.com/easyJet)

+44 (0) 1865 84 1234  
[oxfordacademy@cae.com](mailto:oxfordacademy@cae.com)

  
**CAE Oxford**  
Aviation Academy

# TIME FOR YOUR CAREER TO TAKE FLIGHT



Start your job search today  
[flightglobal.com/jobs](http://flightglobal.com/jobs)

AVIATION | AIRLINES | AEROSPACE





Getting careers off the ground

# flightglobal.com/jobs

EMAIL [recruitment.services@rbi.co.uk](mailto:recruitment.services@rbi.co.uk) CALL +44 (20) 8652 4900 FAX +44 (20) 8652 4877



Flightglobal Jobs

AVIATION CONNECTED

RECRUITMENT



## Line Pilot – Devon Air Ambulance – Salary c £55k (negotiable)

An exciting opportunity for an experienced helicopter pilot to join an organisation committed to providing an outstanding air ambulance operation in and around the county of Devon. With our roots firmly in the community we serve, the successful candidate will demonstrate not only a significant level of relevant overland helicopter experience but also a commitment to the values and ethos of the organisation.

Devon Air Ambulance owns and operates two modern EC135 T2/P2 helicopters from bases at Exeter Airport and Eaglescott Airfield in North Devon. Awarded our own AOC in March 2014, the successful candidate will join an operation that continually seeks to improve and is progressing to night flying operations in late 2016.

For full details of requirements and how to apply please download candidate briefing pack from [daat.org/vacancies](http://daat.org/vacancies). DAATCL is an equal opportunities employer.



Devon Air Ambulance Trading Company Limited

Company Registration No 03876276



Are you an experienced professional pilot with an interest in training?  
Are you a people person who enjoys a professional team environment?  
Do you have > 4000 hours with > 1500 hours of multi crew?

If so, CAE Burgess Hill (UK) are hiring Permanent, Full Time instructors and we provide excellent career progression and lifestyle benefits within a small friendly team.

### What We Offer

Type Ratings on Modern Business Jets  
SFI/SFE qualifications  
Potential Package In Excess of £80K  
Fixed Roster Pattern  
Pension  
Private Healthcare  
32 Days Annual Leave  
Additional "Flying" Days Off  
Payments for working Days Off

The Business Aviation Training sector is expanding and requires pilots with a flexible and adaptable approach who will be focused on delivering the ultimate flight training experience for Business Aviation clients.

### What We Want in Exchange

We expect a minimum 3-year full time commitment, after which freelance contracts will be available if preferred.

If you are looking for a new opportunity in our challenging and rewarding training environment where teamwork is key to our success, we want to hear from you. Please send your CV and a covering letter to: [uk-recruit@cae.com](mailto:uk-recruit@cae.com) quoting the source of this advert. We thank everyone for their interest but only successful candidates will be contacted.

Please see [www.cae.com](http://www.cae.com) for other opportunities.

CAE is today a global leader in modelling, simulation and training for civil aviation and defence. The company employs approximately 8000 employees at more than 100 sites and training locations in approximately 30 countries. CAE offers civil aviation, military and helicopter training services in more than 45 locations worldwide and trains approximately 100,000 crew members yearly.



TIME FOR  
YOUR CAREER  
TO TAKE FLIGHT

Start your job search today  
[flightglobal.com/jobs](http://flightglobal.com/jobs)



## flight crew services

\*EXCLUSIVE\* B737NG Captains Required

- Competitive gross salary plus per diems
- European bases - start date January 2016
- 6 month renewable contract

[flight@resourcegroup.co.uk](mailto:flight@resourcegroup.co.uk)  
[www.resourcegroup.co.uk/fcs](http://www.resourcegroup.co.uk/fcs)

+44 (0) 1256 368 500





**Qatar Executive, Qatar Airways' business jet division,  
is now recruiting qualified pilots.**



### **Current vacancies:** Captains & First Officers

**Move up in your career and embark on a new journey.**

- Become part of our expanding organisation, which offers worldwide luxury air charter services on board one of the most modern fleets in the industry, comprising of Bombardier Global, Challenger 605 and brand-new Gulfstream G650ER aircraft.
- With Qatar Executive being part of the award-winning Qatar Airways' group, benefit from the airline's global expertise and potential.
- Live life to the full in Doha, an up-and-coming global city, with a wealth of cultural offerings and activities.

Join our team and fly for one of the world's finest business jet operations.  
[qatarexec.com.qa](http://qatarexec.com.qa)

Apply via: [careers.qatarairways.com](http://careers.qatarairways.com)





A photograph of a Jet2.com aircraft on a tarmac. The foreground shows the red nose and wing of a plane with 'Jet2.com Friendly Low Fares' written on it. In the background, another Jet2.com aircraft is parked, also with the company name and '22kg bag' visible. A small white ground support vehicle and an orange traffic cone are also on the tarmac.

**Jet2.com**  
Friendly low fares®

# Military Pilots – Leaving the Service?

**UK Military Pilot Open Day – Sunday 18 October 2015**

**Jet2.com** is the North's leading leisure Airline operating a fleet of **B737-800s** & **300s** and **B757-200s**. We fly out of 7 Northern UK Bases including Leeds Bradford, Manchester, Glasgow, Newcastle, Edinburgh, East Midlands, Belfast as well as our Spanish Base in Alicante. Our flying includes our own scheduled services, flights for our package tour operator **Jet2holidays**, and charter flights for other airlines.

We recently announced the acquisition of 27 new aircraft from Boeing. The Next Generation B737-800 will be delivered over a 2 year period from September 2016 to 2018 to support our continued growth.

**Jet2.com** invites you to an Open Day for Qualified Military Pilots interested in their future beyond the Service. If you have or plan to have an ATPL, let us give you an insight into our Company and the life of a Pilot at **Jet2.com**.

## What we offer you:

- **Industry-leading Training at our own Flight Training Centre**
- **Great Team spirit**
- **Great career progression opportunities**
- **Fully bonded Type Rating**

**Why not register your interest at [Jet2careers.com/Pilots](http://Jet2careers.com/Pilots) to find out more?!**\*

\*Spaces are limited and your attendance will be confirmed after receipt of your registration request.

**Interested? Apply online at [Jet2careers.com](http://Jet2careers.com)**

## Flight crew

## Flight Crew Services



- Commercial & VIP Recruitment
- Management Recruitment
- Temporary & Permanent
- Payroll

flight@resourcegroup.co.uk  
+44 (0) 1256 368 500  
www.resourcegroup.co.uk/fcs

## Flight crew

AeroProfessional  
Aviation People Experts

- Recruitment Skills Insights
- Compliance Flight Ops Support

www.aeroprofessional.com

## Maintenance



## Safe Hands

Aviation Recruitment

Call: +44 (0)1524 381 544  
Email: info@safehands.aero  
www.safehands.aero

you're in safe hands with us

## Engineering



Worldwide specialist for  
Aerospace Engineering, Certification &  
Management Services  
E: yourcv@gdcengineering.com  
T: +49 (0) 8153 93130  
W: www.gdcengineering.com

RECRUITMENT FOR  
THE AVIATION INDUSTRY

AVIATION SERVICES  
Tel: +353 1 669 8224  
Fax: +353 1 669 8201

Email: recruitment@sigmaaviationservices.com  
www.sigmaaviationservices.com

PROCTOR  
Aviation

Talk to us for the most exciting  
Expat Pilot Jobs in INDIA

jobs@proctoraviation.com  
www.proctoraviation.com  
+91 22 6120 4400

## Engineering

Aviation  
Strongfield  
Specialist Aerospace  
Personnel

+44 (0)20 8799 8924 amedhurst@strongfieldtech.com  
www.strongfield.com

Technical  
Recruitment  
Solutions

- Product & System Design
- Project Management
- Manufacturing & Supply Chain
- Engineering & Engineering Management

trs@resourcegroup.co.uk  
+44 (0) 1905 368 576  
www.resourcegroup.co.uk/trs

Aviation  
Resourcing  
Services

- Maintenance Personnel
- Production Personnel
- Temporary & Permanent
- Global Reach

flight@resourcegroup.co.uk  
+44 (0) 1638 672 880  
www.resourcegroup.co.uk/ars



The preferred company for Stress (Fatigue & DT), GFEM, Composites, Aeronautical Research. Business units: Contract staff, Workpackages, Innovation and New Concepts, Aeronautical Research. [www.bishop-gmbh.com](http://www.bishop-gmbh.com)  
Contact [bishop.peter@bishop-gmbh.com](mailto:bishop.peter@bishop-gmbh.com)  
Tel 0049-(0)40-866-258-10 Fax 0049-(0)40-866-258-20

Start your job search today  
[flightglobal.com/jobs](http://flightglobal.com/jobs)



# Let your recruitment drive soar...

post your vacancies now  
[recruiters.flightglobal.com](http://recruiters.flightglobal.com)

AVIATION | AIRLINES | AEROSPACE



"Finding the right candidate at the right time can be a major challenge, but Flightglobal Jobs is a really useful channel to reach the best of the aviation talent pool."

European Business Aviation Association (EBAA)





WORK EXPERIENCE BRUCE DICKINSON

# Powerslave to a passion for flight

Although best known as the front man of metal legends Iron Maiden, Bruce Dickinson's background in aviation sees him head a variety of companies in the sector, with a typical week taking him from Malta to Malmo

## How did you get involved in aviation?

It's been a part of my life for as long as I can remember. As a child I used to love putting together plastic aircraft models, and was inspired by my godfather. He served in the RAF as an engineer during the siege of Malta in the Second World War. Now, of course, both those aspects are commemorated in the fact I am the chairman of an aviation business with extensive engineering facilities, with business interests in Malta!

## You have a number of aviation companies. How do you divide your time between them?

It's a challenge, but you have to take the long-term view. I try to ensure I give equal time to each business, but this industry moves so quickly you have to accept that everything could easily change within half an hour.

**Tell us about your typical week** I know it's a cliché to say there's no such thing... but there really isn't! Let me give you an example of how this week is looking and that will give you an idea.

Today I've been involved in phone conversations with all the partners within VVB, the ACMI operator developed by Cardiff Aviation, to get things organised for the next month.

Tonight I'm off to Milan, where I'll be conducting line checks on our flight crew, and I'll be getting my hands dirty flying aircraft myself.

On my return, I will do inter-



Giving interviews to promote his band's new album is all in a day's work

views for the new Iron Maiden album *The Book of Souls*.

Then I'm doing a photoshoot involving a couple of World War One-era triplanes before taking a journalist up in a Bücker Jungmann so he can view the world from some 'unusual angles'.

After that, I'm off to Malmo in Sweden [with VVB] to operate our Boeing 737 on behalf of Iraqi Airways in and out of the UK. It's then due to return to our MRO for routine maintenance, which gives me a chance to meet with our partners in Air Djibouti.

## Does your fame help or hinder your business?

Fame can be useful.

It means people answer the

**"I really don't enjoy working with people who think it's their job to say 'no'"**

phone and are interested in working with you.

However, you only have a few minutes to genuinely engage interest from a business angle – other than that, you're seen as just a curiosity.

So yes, fame is helpful in opening the door, but beyond that, it's business as usual.

## How are the Eclipse 550's prospects in Europe?

Aeris is selling approximately

one per quarter, which isn't a huge amount. However, you have to remember that the new 550 variant is not yet EASA-certified, and this is a major issue for buyers. We have repeatedly fed that back to the managers for the last two years.

On a personal level, it's a delight to fly.

It's the only truly very light jet and the only really well conceived, single-crew jet, in my opinion. It's a very innovative jet that deserves an innovative sales pitch, and we're delighted to be working with Harrods on that.

## Does your passion for music equal your passion for aviation?

There's a question I ask myself every morning when I get out of bed, which is 'which leg do I put down first – left or right?' The answer is that you need both.

## What do you enjoy most about your role in aviation?

This industry is full of amazing, dynamic people to work with. Also, I get to work with jets of all sizes, which I absolutely love.

## What do you enjoy least?

I really don't enjoy working with people who think it's their job to say 'no'. ■



Looking for a job in aerospace? Check out our listings online at [flightglobal.com/jobs](http://flightglobal.com/jobs)

If you would like to feature in Working Week, or you know someone who does, email your pitch to [kate.sarsfield@flightglobal.com](mailto:kate.sarsfield@flightglobal.com)

FG Flightglobal



## LOYALTY 2016

Millennium Hilton, Bangkok  
29<sup>th</sup> February – 2<sup>nd</sup> March 2016

BOOK NOW



In association with:

AIRLINE BUSINESS  
From Flightglobal

[www.flightglobalevents.com/Loyalty2016](http://www.flightglobalevents.com/Loyalty2016)

# France will take the spotlight as “feature country” at Singapore

Singapore Airshow 2016 will welcome France as the Feature Country in the fifth edition of the show, scheduled to take place from 16 to 21 February 2016, at the Changi Exhibition Centre.

The Feature Country series, which made its debut at the 2014 Airshow, was developed as a permanent feature to enable the companies exhibiting within the pavilion to leverage on the Singapore Airshow as a strategic platform; lending support to businesses of the Feature Country and enabling them to tap the opportunities in the Asia Pacific region and beyond.

The French Pavilion will be located at a prominent spot within the exhibition hall. Participating exhibitors will have access to a dedicated “Deminar” area – a demonstration and seminar area for research institutes and universities to showcase their latest technologies and innovations. In addition, business meetings between the French Pavilion exhibitors and VIP delegations will also be specially facilitated.

“Being a Feature Country at the Singapore Airshow 2016 gives us the unique platform to bring together our latest and best aviation technologies to meet the growing appetite for innovation in the Asia Pacific aviation sector, translating into real business deals for our French companies,” said Emeric D’Arcimoles, the Paris Air Show Chairman and Chairman of the



International Committee of Groupement des industries françaises aéronautiques et spatiales.

The French aerospace, defence and security industry is worth 47.9 billion Euros, and specifically, out of which 30.4 billion Euros is contributed by exports. This shows that France is well-placed to leverage its Feature Country platform to bring its latest innovations to the region’s top decision-makers converging at Singapore Airshow 2016.

This comes at an opportune time in the Asia Pacific aviation industry, where the com-



an **experia** event

mercial aerospace sector is expected to set new records for aircraft production in 2015, off the back of the accelerated replacement cycle of obsolete aircraft and growing passenger travel demand in the Asia Pacific region. Countries in the region are also increasing defence spending to equip their militaries with modern defence platforms and technologies.

Reflecting this growth is the continued expansion of reach and impact of each new edition of Singapore Airshow. The 2016 show is already 80 per cent committed, with specialised spaces like the Aerospace Emerging Technologies Zone, the Training and Simulation Zone and the introduction of the Business Aviation Zone, to further spawn business development opportunities.

For more information about the Feature Country programme, please contact Ms Chong Kam Lin at [kamlinchong@experiaevents.com](mailto:kamlinchong@experiaevents.com) or +65 6595 6124.

## Hosted Buyers Programme offers new partnership opportunities

Buyers seeking specific products and solutions at Singapore Airshow 2016 can now leverage on the Hosted Buyers business matching programme to source new contacts and explore new ventures.



Accorded with a complimentary 4-day Hosted Buyer Pass and exclusive hospitality arrangements during the trade days, each eligible buyer will enjoy a hassle-free business meeting experience as pre-scheduled meetings are facilitated with exhibitors that match their requirements.

For more information about the Hosted Buyers Programme, please visit [www.singaporeairshow.com/hosted-buyers-programme](http://www.singaporeairshow.com/hosted-buyers-programme) or contact Ms Tan Kai Li at [kailitan@experiaevents.com](mailto:kailitan@experiaevents.com) or +65 6595 6125.

**REGISTER NOW & STAND TO WIN COMPLIMENTARY HOTEL STAY\* IN OUR LUCKY DRAW!**

Submit your registration by 30 November 2015 and enjoy the Early Bird Rates too!

Find out more at:  
[www.singaporeairshow.com/register](http://www.singaporeairshow.com/register)

\*Terms and conditions apply.

